BRITISH MEDICAL JOURNAL

LONDON SATURDAY JANUARY 8 1938

ANGINA OF EFFORT: A CLINICAL STUDY

BY

GEOFFREY BOURNE, M.D., F.R.C.P.

AND

R. BODLEY SCOTT, M.A., D.M., M.R.C.P.

(From the Cardiographic Department, St. Bartholomew's Hospital)

The clinical differences between the types of cardiac pain have been described in a previous paper (Bourne, 1935) and have also been stressed in a later one, "Angina Innocens: A Clinical Study"* (Bourne, 1937). The present communication is a full analysis of a series of 112 patients suffering from the symptom of angina of effort. The method of presentation of these papers dealing with the various types of cardiac pain might suggest that an attempt was being made to describe individual diseases. This is by no means the case, but the definite clinical pictures provided by the different varieties of cardiac pain are so clear and distinct that it is believed that the mechanisms vary in each individual type of pain. Since at the moment it is quite impossible to determine minor and transitory changes in the coronary circulation by any other means, a careful scrutiny of the symptomatologies is an essential method of approach to the problem. There are several possible organic causes of the symptom of angina of effort, presupposing this symptom to be the result of interference with coronary flow during exercise: coronary atheroma and syphilis of the aorta interfering with coronary flow are the commonest causes. Furthermore, cases have been described where severe anaemia was associated with angina of effort and where no evidence of cardiovascular disease was found at necropsy. (Cabot, 1926; Willius and Giffin, 1927; Elliott, 1934.)

The large majority of the patients here described were presumably suffering from coronary atheroma; seven had syphilitic aortitis, and one of these also had hypertension; one patient showed Addisonian anaemia as the only abnormality; and two had severe hypochromic anaemia; one of the last two, who in addition had aortic stenosis, lost his pain when the anaemia had responded to treatment.

Definition and Symptomatology

By angina of effort is meant a cardiac pain generally arising centrally or to the left of the sternum, sometimes radiating to one or both arms, which has an exactly quantitative relation to exertion. In a given case a given amount of exertion will produce the pain, and cessation of that exertion will be followed immediately by a progressive diminution in and the disappearance of the pain. The pain never comes on at rest, except for the following exception. In a few cases, as in 10.7 per cent. of the present series, severe emotion may produce some pain; and since such emotion is associated physiologically with an increase in the heart rate and a raised blood pressure, it would be curious if in cases of angina of effort pain did not occasionally appear under these circumstances also. The effect of emotion in patients with angina of effort, however, is subsidiary in point of degree. The patient does not spontaneously complain that emotion produces the pain: it is only in response to a leading question that this is discovered. The outstanding symptom is pain which accompanies physical exertion, quantitatively, and which disappears with rest. The series here described is one consisting of cases of pure angina of effort; this fact is stressed because in any large consecutive series of cases of cardiac pain mixtures of the types of pain are not infrequent—for example, spasmodic angina is nearly always superimposed on an angina of effort, angina of effort is frequently complicated by coronary thrombosis, and the angina innocens type of pain has been observed to follow a coronary thrombosis. The various clinical pictures, however, are definite and distinct. *Provided a careful history is taken*, confusion between the different types of pain should not occur.

Reasons for Analysis

The chief reasons for analysing carefully a group of patients suffering purely from angina of effort are: first, that the different history from that given by patients with spasmodic angina suggests the presence of a different mechanism of pain production; secondly, that many patients are met with who have a history of pure angina of effort, and it is therefore helpful, so far as prognosis is concerned, to determine the expectation of life in a fairly large group of patients with an uncomplicated history of this definite symptom; thirdly, that with the introduction of new methods of treatment an accurate classification of clinical material is likely to be helpful in more accurately gauging the results of such treatment.

Exercise or physical effort produces different effects on the different types of cardiac pain. In the case of angina of effort this has already been described. An attack of

* Since the publication of the above paper a certain amount of criticism of this label has arisen. Such criticism, as in the case of "pseudo-angina" and "secondary angina," has been entirely destructive. It is clear that the syndrome needs a definite name in order to stimulate an accurate inquiry into the signs and symptoms present in any individual patient. It is therefore in the hope that some better nomenclature may arise, and in the absence of any better term, that the name "angina innocens" is maintained.

spasmodic angina is often initiated by exercise, but on the cessation of exercise a spasmodic attack continues or becomes even more severe: it "has to run its course." In the case of angina innocens (Bourne, 1937) it is often inaccurately stated by the patient that exercise brings on the pain, but further careful analysis of the symptom makes it clear that the pain is worse *after* rather than during exercise, and is continued for a long period while the patient is at rest. Coronary thrombosis occasionally manifests itself, if the thrombosis is a small one, by an angina of effort type of pain; but in contradistinction to the cases without thrombosis the onset is sudden, and after some days the pain generally becomes considerably less severe, and frequently disappears; the suddenness of the onset, the early severity, and the progressive improvement are characteristic of this latter clinical type.

Angina of effort, on logical grounds, would appear to be the type of pain most likely to be associated with a chronic organic lesion interfering with the coronary circulation. This probability seems to be borne out by the analysis of the present series of cases.

Historical

The relation between exercise and anginal pain has been recognized since the days of Heberden, and the probable relation between this type of pain and disease of the coronary vessels has been suspected since the observations of Jenner. There appears, however, to be no clinical study restricted to cases which show this pure exercise type of pain only. The historical steps subsequent to the writings of Heberden, Jenner, and Parry have been traced in Lewis's paper (Lewis, 1932), which also describes a series of experiments on the rhythmic and repeated muscular contractions in an arm whose blood supply was periodically occluded by a sphygmomanometer band. Lewis's main conclusions are that the pain produced in the muscle under these conditions is not due to the presence of arterial spasm and that it is not a direct result of lack of oxygen. He believes that the "pain is due to a stimulus arising directly or indirectly out of the contraction process," and that some chemical or physicochemical agency is present as a causative factor within the muscle mass. Further, he concluded that this factor acts in tissue spaces though it is dependent on processes occurring within the muscle fibre as a result of its contraction. He believes that the pain is due to the accumulation of the factor in the tissue spaces, this accumulation being assisted if the blood flow through the spaces is lessened, and prevented if the blood flow is adequate. The condition in the heart whose circulation is impaired during exercise is probably closely analogous to that present in the muscles of the arm when these are exercised during a period of ischaemia.

Clinical Material

The clinical material of our series consists of 112 cases, forty-three seen in private practice and sixty-nine in the cardiac follow-up department of St. Bartholomew's Hospital. Of these, ninety-eight, or 88 per cent., were men, and fourteen, or 12 per cent., were women. In the private group there were three women, or 7 per cent., and in the hospital group eleven women, or 16 per cent. The age incidence is shown in the following table, the most striking fact perhaps being the earlier incidence of the syndrome in hospital cases. This may be explained by one of two factors—either that worry is more severe or that atheromatous changes are more common in the latter class.

TABLE I.—*Age Incidence*

Age	Private	Hospital	Total
30-39	0	4	4
40-49	4	14	18
50-59	15	22	37
60-69	17	24	41
70-79	7	5	12

Methods of Examination

In all cases a full history was taken. In the past history the following points were specifically investigated: rheumatic fever, growing pains, chorea, scarlet fever, tonsillitis, diphtheria, syphilis, and the history of the puerperium. Note was also taken of other diseases or surgical operation. A history of previous mental stress or trouble was not inquired into in every case. The following symptoms were investigated in each patient: pain, dyspnoea, sighing, orthopnoea, feeling of constriction, palpitation, exhaustion, cough, giddiness, dyspepsia, state of the bowels, catamenia, frequency of micturition. With regard to the pain the points elicited were: its character, position, radiation, duration, relation to exercise and emotion. The patients were asked whether the pain occurred during exercise, in a quantitative manner, or whether it would be worse when the exercise had been finished; also whether it was ever evident when they were resting or in bed. Inquiry was made about their present and past work, their ability to play games, to walk (with special reference to hills), to climb stairs, and to run; and also the quality of their sleep and their habits as regards smoking and alcohol.

Physical examination included special notice of the presence of dyspnoea, orthopnoea, cyanosis, pallor, pulsation, clubbing of the fingers, and tremor; the pulse rate; the state of the peripheral arteries and veins. The heart was examined by inspection, palpation of the apex beat, palpation of the praecordium for abnormal impulse or thrills; the position of the apex beat, the area of cardiac dullness, and the sounds were noted. Precordial hyperaesthesia was tested for in every case and the lungs and abdomen examined. An electrocardiogram was taken, and in some cases repeated. The Wassermann test was done. A six-foot film of the heart was taken, the contour of the heart noted, and the heart–chest ratio measured. In the private cases, however, a Wassermann reaction was only done if syphilis was definitely suspected, and an *x*-ray examination was not made in all cases.

Aetiology

The following were the chief points which emerged in considering the previous history of these patients. There was a history of rheumatic fever or chorea in ten, or 8.9 per cent. A history of syphilis was present in sixteen, or 14.3 per cent.; of these sixteen cases five gave a positive history of previous infection, the Wassermann reaction being negative, and seven had at the time of examination clinical evidence of a syphilitic aortitis with a positive Wassermann reaction. Syphilis and rheumatism were both somewhat commoner in the hospital group. A history of malaria was present in nine, or 8 per cent. Nine patients, or 8 per cent., had diabetes mellitus. One patient was suffering from pernicious anaemia, and two from idiopathic hypochromic anaemia; in all three cases successful treatment of the anaemia removed the cardiac pain. The state of the gall-bladder

was carefully investigated by cholecystography in all patients showing symptoms giving rise to suspicion of this condition. Cholecystitis was suspected in five patients, and was proved to be present in three cases. Among the other pathological states occurring in these patients the most striking is hemiplegia, which was found in three cases. Herpes zoster had occurred in three cases also.

An attempt was made to divide off the patients according to the physical and mental stress of their professions in order to determine the effect of this upon the presence of angina of effort. The mode of life was physically strenuous in thirty-two, or 28 per cent.; was physically and mentally strenuous in fourteen, or 12 per cent.; was mentally strenuous alone in forty-one, or 36 per cent.; or not strenuous physically or mentally in twenty, or 18 per cent. In 6 per cent. of cases there is insufficient evidence in the notes to come to an opinion on this point.

The Pain of Angina of Effort

The site of origin of the pain was worked out independently in the private group by G. B. and in the hospital group by R. B. S.; the results in each group are strikingly similar. The pain was central in 70.1 per cent. of the hospital cases and in 70 per cent. of the private cases. It arose in the left chest in 17.4 per cent. of the hospital cases and in 17.6 per cent. of the private cases. When angina of effort arises in the left chest it tends to appear in the upper rather than the lower half and does not start from the region of the heart's apex; these are minor distinctions between the left-sided pain of angina of effort and the left-sided pain of angina innocens. It started in the right chest in 4.4 per cent. of the hospital cases and in 4.7 per cent. of the private cases. The origin was epigastric in 4.4 per cent. of the hospital cases and in 2.3 per cent. of the private cases. It started in the left hypochondrium in one case, and in the left arm in two cases. Radiation was not invariable, as the pain remained localized to the site of origin in thirty-eight cases. When radiation occurred it was most frequent to the left arm; it sometimes occurred to both arms and less frequently to the right arm alone. Radiation to the abdomen and to the throat also occurred.

The association of the pain of angina of effort with other symptoms is shown in Table II. The accentuation

TABLE II.—*The Association of Angina of Effort Pain with Other Symptoms*

	Private Cases		St. Bart's		Total	
	No.	%	No.	%		%
With dyspnoea	19	44.2	54	78.3	73	65.1
On undressing	2	4.7	4	5.8	6	5.4
With constriction	23	53.5	50	72.5	73	65.1
With palpitation	0	—	11	16.0	11	9.8
With giddiness	2	4.7	3	4.4	5	4.5
With exertion after meals. (Total number)	9	21.0	26	37.7	35	31.2
With exertion after meals and without actual dyspepsia	6	14.0	11	16.0	17	14.9
Pain increased in cold wind ..	3	7.0	5	7.3	8	7.1
Patients who "walk it off" ..	5	11.7	4	5.8	9	8.0
Patients with dyspepsia. (Total number)	9	21.0	30	44.0	39	34.8
Patients with dyspepsia in whom food did not affect the anginal pain	6	14.0	14	20.3	20	17.8

of the pain if exercise is taken following a meal is clearly shown, but the effect of cold is less marked than in spasmodic angina. In some patients the severity of the true angina of effort pain following a meal is so extreme that almost invariably in the case of the patient, and sometimes in the case of his medical attendant, it is thought to be due exclusively to some form of dyspepsia. The effect of food physiologically is to produce splanchnic congestion and systemic ischaemia, to increase the forcefulness of cardiac contraction, and to produce changes in visceral nervous tone. It is thus easy to account for the exacerbation of effort pain after food in patients suffering from angina of effort. The ability of certain patients to "walk off" the pain, or as in one case to work it off by the use of a heavy hammer, was originally noticed by Heberden, one of whose patients wrote him a letter describing accurately this peculiarity (Heberden, 1785). The fear of impending death, which is such a dramatic characteristic of the typical attack of spasmodic angina, has not been met with at all in the present series of cases of angina of effort. The explanation is probably that in this condition relief from the pain can be obtained immediately by ceasing the effort which is producing it. The patient thus does not push himself to a point where a pain is at all severe. In spasmodic angina, where the attack has to run its course, however slight the causative stimulus may have been, the patient feels helpless in the presence of the attack, which as it were gets out of hand. In these circumstances a sensation of impending death is easily understandable.

Other Cardiovascular Symptoms

Orthopnoea was present in 31 per cent. of the cases and paroxysmal dyspnoea in 4.5 per cent., but slight exhaustion was frequent, as it occurred in 52 per cent. Exhaustion of a severe type was complained of in only 5.4 per cent. Giddiness was fairly common, as would be expected in patients with vascular disease; giddiness on rising was present in 15.8 per cent., and giddiness at other times in 24 per cent. Fainting occurred in only two cases, one of these having aortic regurgitation.

Incidence of Cardiovascular Disease in Angina of Effort

Of the 112 patients, six died suddenly and unexpectedly; two died with the classical symptoms of acute left ventricular failure; twenty-eight suffered from a coronary thrombosis, proved electrocardiographically or giving a typical history; four suffered from aortic stenosis and three from aortic regurgitation; four had a proved active syphilitic aortitis; four had a systolic murmur at the aortic base, together with an enlarged heart as proved radiologically; one had a harsh systolic murmur typical of mitral regurgitation, with a systolic thrill at the apex, and with hyperpiesis; four had bundle-branch defects, shown electrocardiographically; five had inversion of the T wave in Lead I or II, or both; two had PR intervals greater than 0.2 of a second; fourteen had hyperpiesis together with enlargement of the heart, as shown radiographically; seventeen had enlargement of the heart, proved by radiograph, with a normal blood pressure; and five had hyperpiesis without evidence of cardiac enlargement. This leaves a group of thirteen, or 11.6 per cent., in whom no evidence of cardiovascular disease was discovered. It is apparent that 88.4 per cent. provided unquestionable evidence of chronic cardiovascular disease.

It must, however, be remembered that a heart may appear normal clinically, electrocardiographically, and by *x*-ray examination, and may yet have an advanced degree of coronary disease (Bourne, 1936). A further point to be remembered is that interference with coronary

flow may only be relative. Coronary ischaemia may occur either because there is a narrowing of some part of the coronary circulation or because there may be at some point in the coronary circulation an area of slight disease which produces loss of elasticity of the vessel. Under this latter condition the coronary flow would be normal except during such a state of exercise as would require a greater flow of blood than the inelastic vessel could provide. The cardiac nutrition would not suffer under these circumstances, but pain of a typical effort character would result from the relative cardiac ischaemia produced during exertion. The presence or the degree of pain depends also on other factors, such as possibly the psychological state of the patient (Bourne, Scott, and Wittkower, 1937; Wittkower, 1937), or on the degree of sensitiveness of the nervous system.

Three negative points are worthy of notice. In the above list of cardiovascular conditions there is no case of congestive failure, no case of auricular fibrillation, and only one of mitral disease, this being a case of mitral regurgitation. Mitral stenosis is conspicuously absent.

Relation between Angina of Effort and Coronary Thrombosis

The estimation of the incidence of coronary thrombosis in a series of cases depends, first, upon the proof of the condition electrocardiographically, and, secondly, on the presence of a typical history of an attack. We did not regard the latter point as positive unless the patient had suffered from a severe attack of precordial pain, so acute as to be incapacitating and lasting continuously or intermittently over a number of days. In many cases there was a history that the pain needed relief by an injection of morphine, and in most of them there was evidence that such an attack was followed by a diminution in the patient's powers of physical activity. Wherever an attack of this nature had been sufficiently recent the correctness of the diagnosis was confirmed by the fact that changes were still occurring in the electrocardiographic tracings.

Coronary thrombosis might initiate the patient's period of ill-health, might occur as an incident during its course, or might be the terminating event of the illness. Coronary thrombosis was proved to have initiated the condition in two cases, and a typical history suggesting that it had done so was present in fifteen others; it was proved to have occurred in two cases during the course of the illness; and a typical history of coronary thrombosis was present in ten others, also during the course of the illness. Coronary thrombosis was proved to have terminated the illness in two cases, and probably did so in one other. The total number of patients having a coronary thrombosis at some time during the illness was thirty-two, or 28.6 per cent.; the number having more than one coronary thrombosis was five, or 4.5 per cent.

The clinical history of angina of effort, in so far as this condition is related to coronary thrombosis, may be of one of three types. A coronary thrombosis may occur and may be followed directly by angina of effort, which may subside, with complete recovery from cardiac pain; alternatively, the angina of effort may be persistent. Another train of events may be as follows. A coronary thrombosis is succeeded by angina of effort which disappears, but a subsequent attack of illness of another type—for instance, influenza—may result in a recrudescence of the angina of effort symptoms. In other cases coronary thrombosis may be followed by angina of effort which, although it improves very gradually up to a point, never completely disappears.

Prognosis

The death rate of the whole group was 22 per cent.; in the private cases this was 28 per cent. and in the hospital cases 19 per cent. Table III and the chart give the number of years between the first onset of the symptoms and the date on which the patient died or was last seen; the chart thus shows graphically the length of life either from the first onset of angina of effort or from the onset of a coronary thrombosis which was followed by a period of angina of effort; in two of the patients giving the latter history the pain cleared up completely. Since the history only extends up to a period of two years in a large number of cases it is clear that the data as regards duration of life are not complete. But it is equally evident, taking into account the age of the patients, as shown in Table I, and considering this in relation to the survival figures, that the survival rate is not far short of that which would be expected for patients of that age without angina of effort but with evidence of cardiovascular disease. The death rate is: for the first year 20 per cent., for the second 35 per cent., for the third 12 per cent., for the fourth 20 per cent., for the fifth 33 per cent., for the sixth and seventh *nil*, and for the eighth 33 per cent. The series is, of course, too small for any definite conclusion to be drawn, but the figures appear to indicate that the chance of death is more or less the same for a patient with angina of effort during each of the first five years. A point that needs to be stressed is that *death in an attack of angina of effort is not recorded in the present series*, and it would therefore seem that *angina of effort is of itself not a dangerous symptom*, but that it is an indication of a greater or lesser degree of coronary disease. Only one patient died in pain, and a careful history of the attack, taken from an intelligent friend who was with him throughout, leaves little doubt that this patient had been seized with a coronary thrombosis early in the morning, and that death occurred while he was endeavouring to

TABLE III

Years ..	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	11-12	14-15	19-20	Totals
Alive ..	24	19	14	8	6	7	2	2	1	2	1	1	1	88
Dead ..	6	10	2	2	3	0	0	1	0	0	0	0	0	24
Total ..	30	29	16	10	9	7	2	3	1	2	1	1	1	112

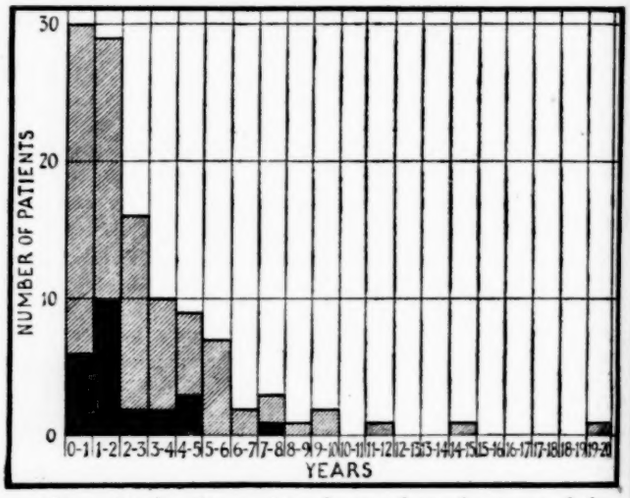


Chart showing the number of years from the onset of the symptoms to the date on which the patient died or was last seen. Shaded areas = patients alive; black areas = patients dead.

remain up and about, later in the day. Of the twenty-five deaths four were from non-cardiac causes, in five the cause was unknown, and sixteen resulted from cardiac causes.

These conclusions would seem to indicate that "angina pectoris"—to use the inaccurate and general label—is not a dangerous symptom; for death does not occur during the attack of pain, and except in so far as it is the manifestation of a terminal coronary thrombosis the pain itself is not the fatal condition it is so commonly thought to be. This being so, it is the duty of the medical profession to discard the attitude of terror and taboo which is still so prevalent when dealing with and discussing this symptom, and to teach the general public that "angina" is in most cases not a dangerous or fatal condition; that, on the contrary, it is compatible with many years of useful life and is amenable to treatment; that danger is only to be feared from the underlying vascular disease.

Factors Influencing Prognosis

It can be said at once that the numbers in this series are too small for any accurate statistical analysis, but the following facts appear to emerge. Cardiac asthma, as would be expected, is a dangerous symptom, for all three patients died within two years. Abnormalities in the T wave of the electrocardiogram in Leads I and II seemed to be the next most serious finding. Seven out of ten patients in whom the T wave was inverted in Lead I or Lead II, or both, died, and two out of three patients died in whom the T wave was diphasic in Lead I or II. Thus nine out of thirteen patients with abnormalities of the T wave in Leads I and II died. This abnormality was not the transient electrocardiographic change of coronary thrombosis, but was persistent and permanent. Dyspnoea on exercise of a moderate degree was not more common in patients who subsequently died; not enough evidence was obtained that the presence, the absence, or the degree of dyspnoea resulting from exercise was helpful in prognosis. Coronary thrombosis is obviously likely to be a common cause of death in this group; but it is remarkable that the twelve patients in whom angina of effort started with a coronary thrombosis all remain alive. Active syphilis produced death in two cases out of eight; a third syphilitic patient died, but with coronary thrombosis in an atheromatous vessel. Diabetes appeared to make no difference to the prognosis.

It would thus seem that the cardiac prognosis ultimately depends upon whether or not a fatal coronary thrombosis is likely to develop, and upon the state of the left ventricular muscle. The only safe guide to determining this second point would be the amount of exercise that such a patient can undertake. This is of course generally restricted by the exercise pain. Some patients, however, can on some days undergo far more exertion without suffering pain than they can on others, and in these circumstances ability to climb hills or to walk reasonably well during a painless period is the most valuable prognostic point obtainable. Other complications of vascular disease, such as cerebral thrombosis, may prove fatal; this occurred in four cases in the present series.

Conclusions

1. Angina of effort is a clear-cut and definite symptom.

2. Angina of effort is associated in a very high percentage of cases with provable organic cardiovascular disease.

3. In our opinion, taking into account the impossibility in some cases of proving during life that coronary disease exists, angina of effort does not occur without coronary disease, except possibly in some cases of severe anaemia.

4. This coronary disease may be severe or slight, and probably in the majority of cases does not cause obstruction to the blood flow in the resting heart, but produces its effect by interfering with the normal stretching of the coronary arteries which occurs during exertion.

5. Angina of effort is in itself not a dangerous symptom: patients do not die in an attack. Danger is only to be apprehended from the occasional occurrence of coronary thrombosis, from the results of coronary atheroma on the ventricular muscle, or from other vascular accidents.

REFERENCES

Bourne, G. (1935). *British Medical Journal*, **1**, 1109.
—— (1937). Ibid., **1**, 695.
—— (1936). *Lancet*, **2**, 551.
—— Scott, R. B., and Wittkower, E. (1937). Ibid., **2**, 609.
Cabot, R. C. (1926). *Facts on the Heart*, 1st Ed., p. 555, Philadelphia.
Elliott, A. H. (1934). *Amer. J. med. Sci.*, **187**, 185.
Heberden, W. (1785). *Med. Trans. Coll. Phys. Lond.*, **3**, 3.
Lewis, T. (1932). *Arch. int. Med.*, **49**, 713.
Willius, F. A., and Giffin, H. Z. (1927). *Amer. J. med. Sci.*, **174**, 30.
Wittkower, E. (1937). *Lancet*, **2**, 665.

THE SHORTAGE OF CALCIUM IN THE "POORER-CLASS" DIET

BY

KATHARINE H. COWARD, D.Sc.Lond.

ELSIE W. KASSNER, F.I.C.

AND

LETITIA W. WALLER

(From the College of the Pharmaceutical Society, London)

Certain routine tests carried out in this laboratory gave results which emphasized the fact that the ordinary diet of the poorer classes, consisting largely of bread, margarine, jam, potatoes, some meat, and a little milk and fresh vegetables, might be seriously deficient in bone-forming elements. An experiment designed to test this point has amply confirmed the suspicion.

Simpson and Wood (1935) investigated the influence of supplements of (*a*) cod-liver oil, (*b*) halibut-liver oil plus dried milk, and (*c*) virol to the diet of children attending various infant welfare centres in a typical London area. The children were mostly from working-class homes, and their diet was not controlled by the investigators. The doses of the three supplements were adjusted so that each child received an additional 75 calories a day. The amount of vitamin D received daily as cod-liver oil by each child was 2,080 international units, contained in 8 grammes of oil, which was therefore a very rich sample. (The *British Pharmacopoeia 1937* Addendum requires a minimum vitamin D content of 85 international units per gramme.) The dose of halibut-liver oil gave approximately three and a half times as much vitamin A (as judged by "blue units") and a quarter as much vitamin D as the dose of cod-liver oil. Since the daily dose of halibut-liver oil was only 0.2 gramme, an extra half-ounce of dried milk was given to bring the calorie value of the total supplement up to that of the cod-liver oil supplement. The daily dose of virol was 20 grammes, stated to have a

calorie value of 74. Its vitamin content was said to be not so high as that of the doses of cod-liver oil or halibut-liver oil, but "sufficient to obviate the possibility of a complete lack of vitamins in the basic diet." Its special value as a supplement was thought to be due to its balance of protein, fat, and carbohydrate. The result of this investigation, stated briefly, may be said to show that the giving of cod-liver oil or of halibut-liver oil plus milk was beneficial, but that virol was more beneficial still. An elaborate statistical examination of the results showed that the observed differences might be considered significant.

The question that interested us was what might be the deficiency in the children's diet that was being made good by the addition of 20 grammes of virol a day. It seemed scarcely possible that about three-quarters of an ounce of a "well-balanced" food could seriously affect the increase in weight of a child. Moreover, when the 22.4 per cent. of volatile matter, probably mostly water, was allowed for, it left only 16.52 grammes of well-balanced food—very little more than the half-ounce (14.17 grammes) of dried milk which had not had a beneficial effect, although milk must surely be one of the best-balanced foods known. This, then, did not appear to account for the result obtained.

An examination of the published list of contents of virol—namely, marrow fat, glycerin, extract of red bone marrow, eggs, salts of calcium, iron, etc., malt extract, and the juice of fresh lemons—suggested that the vitamin B it contained might be high enough to produce beneficial effects when the basic diet was low in these factors. A biological determination of the vitamin B_1 value of a sample of virol purchased in the open market was made in this laboratory. It was found to be 0.7 international unit per gramme. Thus the daily dose of virol given to each child contained about 14 international units, and since a child of 4 years requires about 55 international units of vitamin B_1 a day, this cannot be considered a very large contribution to its needs. Moreover, the supplement of dried milk would contain 6 to 9 units of vitamin B_1 if none had been lost in the drying. It is unlikely that modern methods of drying milk would reduce the vitamin B_1 potency much, and it was concluded from these calculations that it was probably not the presence of vitamin B_1 in the virol that accounted for its beneficial effect on the children.

First General Nutrition Experiment on Rats

It was therefore decided to repeat the whole experiment on rats as it had been carried out on the children. Four groups of eight rats each were used, to correspond to the four groups of children. Litters of four or eight rats were divided among the groups so that each litter was represented equally in each group, which comprised three male and five female rats. Each rat was kept in a separate cage throughout the experiment, and the cage was provided with a grid so that the animal had no access to faeces. Fresh tap-water of the Bloomsbury district was supplied daily.

The experiment was carried on for six weeks. Throughout that time the rats were weighed twice a week. The diet given to all the rats was chosen so as to be as much like the diet of the poorer classes as possible. The scheme drawn up at the beginning and followed with almost no variation is given in Table I.

The groups of rats received supplements similar to those given to the groups of children—namely: Group 1, no supplement; Group 2, cod-liver oil; Group 3, halibut-liver oil; Group 4, virol. The doses of cod-liver oil, halibut-liver oil, and virol respectively were determined from the following consideration. The calorie requirement of children from 2 to 3 years is 1,100 to 1,400; that of children of 3 to 6 is 1,400 to 1,700 (Ministry of Health Nutrition Report, 1934). If the average requirement of the children in the experiment was 1,500 calories, then the 75 calories given as a supplement would be one-twentieth of their daily needs.

TABLE I.—*Diet Sheet for the First Nutrition Test*

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
White bread, 12-15 gm.*	White bread, 12-15 gm.*	White bread, 12-15 gm.*	White bread, 12-15 gm.*	White bread, 12-15 gm.*	White bread, 12-15 gm.*	Hovis bread, 12-15 gm.*
Margarine, 0.1 gm.	Meat, cooked, 0.5 gm.	Butter, 0.1 gm.	Meat, cooked, 0.5 gm.	Butter, 0.1 gm.	Greens, boiled, 1 gm.	Sausage, cooked, 1 gm.
Jam, 0.2 gm.	Tea with milk, 2 c.cm.	Jam, 0.2 gm.		Jam, 0.2 gm.	Milk, 2 c.cm.	
Boiled potato, 1 gm.		Boiled potato, 1 gm.		Boiled potato, 1 gm.		
Greens, boiled, 1 gm.		Greens, boiled, 1 gm.		Tea with milk, 2 c.cm.		
				Fish, cooked, 0.5 gm.		

* Never all eaten, but excess given so that the rats should not be hungry.

A rat of 40 grammes weight requires 4 to 5 grammes dry weight of fat-free food a day. The rats' supplement for this experiment should supply one-twentieth of the calorie intake—that is, 1/20 of 20 calories, which is 1 calorie. The dose of cod-liver oil given to each child of Group 2 was 8 grammes: therefore the dose for each rat of Group 2 was 1/75 of this, which was 0.11 gramme. This would yield 1 calorie.

Similarly the dose of halibut-liver oil given to each child of Group 3 was 0.2 gramme, and therefore the dose for each rat of Group 3 would be 1/75 of 0.2 gramme, which was 0.0027 gramme. This would yield 0.025 calorie. Also 1/75 of 1/2 oz. of dried milk would be 1/75 of 14.17 grammes = 0.19 gramme—yielding about 1 calorie. The dose of oil was given as one drop of a dilution of halibut-liver oil (27 in 200) in olive oil. The dose of dried milk was weighed for each rat and given on a small dish, moistened with water. It was stated that 20 grammes of virol had a calorific value of 74, therefore 0.27 gramme of virol would have a calorific value of 1. This was given on a small dish. It was always taken readily.

It is recognized that giving supplements to experimental rats was not necessarily comparable to giving supplements to children, for it is possible that the children did not receive enough food (calories) for their needs, whereas the rats were given more food than they ate. Experiments on rats are almost always carried out in this way, for a rat eats only enough each day for its needs, the amount having often been shown, from records of food given and food left, to be fairly constant from day to day.

The cod-liver oil and halibut-liver oil used for the rats were as nearly as could be judged of the same vitamin A and D content as the oils used for the children. The vitamin D content of the oils used for the children was stated in international units, but the vitamin A value was only given in "blue units," and other oils with similar "blue value" cannot be regarded as having necessarily the same vitamin A values. Oils of nearly similar vitamin D and "blue" values were used for the rats, and the

doses of both cod-liver and halibut-liver oils were so high that they must have contained abundance of vitamins A and D to satisfy the rats' needs.

Result of First Experiment

(*a*) *Increase in Weight.*—The effect on the weights of the rats may be seen in the accompanying chart of the growth curves. The variation between the rats of any one group is not great. The results are summarized in Table II. The average increase in weight of the control rats given the "poorer-class" diet only was 42.95 grammes in six weeks; that of the rats receiving the cod-liver oil supplement was 67.65 grammes; and that of the rats given the halibut-liver oil plus dried milk was 78.95 grammes—clear evidence of the lack in this diet of factors (for example, vitamins A and D) which can be supplied by cod-liver oil and by halibut-liver oil plus a little dried milk. On the other hand the increase in weight of the rats given the supplement of virol was 45.75 grammes, which was only slightly, certainly not significantly, greater than that of the rats receiving no supplement. We have completely failed to reproduce in rats the effect which Simpson and Wood obtained on children and to discover what determined the effect.

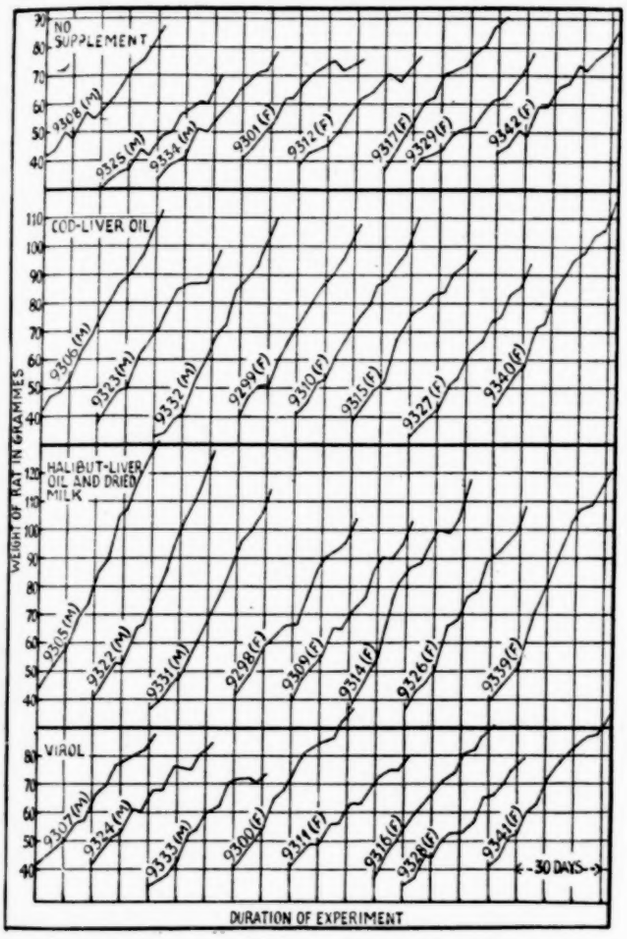


Chart showing the effect of giving (*a*) no supplement, (*b*) cod-liver oil, (*c*) halibut-liver oil plus dried milk, (*d*) virol on the increase in weight of rats fed on a diet as much as possible like that of the poorer classes. The three supplements are of equal calorific value.

TABLE II.—*Average Increase in Weight in Six Weeks of Four Groups of Rats given a Mixed "Poorer-class" Diet, with Supplements in Three of the Groups*

	Average Increase in Weight in Six Weeks (grammes)		Average Increase in Weight of Males and Females (grammes)
	Males	Females	
Group 1 (No supplement)	43.7	42.2	42.95
„ 2 (+ Cod-liver oil)	69.7	65.6	67.65
„ 3 (+ Halibut-liver oil and milk)	84.3	73.6	78.95
„ 4 (+ Virol)	42.7	48.8	45.75

(*b*) *Further Comparison of the Supplements by a Different Criterion—"Ash Content of the Bones."*—Before the termination of the experiment we decided to compare the four groups of rats by another criterion—namely, the ash content of the bones—to see whether some constituent of the virol might have had an effect on calcification which could not be brought about by vitamin therapy alone. Accordingly, the percentage of ash of the dry extracted bone (one femur and one humerus, separately, of each rat) was determined in four rats in each group. The result may be seen in Table III.

TABLE III.—*The Percentage of Ash in the Dry Extracted Bone (Femur and Humerus) of Four Rats of Each of the Groups 1, 2, 3, and 4*

Group	Supplement	Litter	Rat	Ash in Dry Extracted Bone	Average Ash Content
				%	%
1	None	6472	9308 (M)	F 43.31	
				H 40.28	
		6475	9334 (M)	F 38.07	
				H 38.73	40.19
		6473	9317 (F)	F 37.34	
				H 39.44	
		6476	9342 (F)	F 42.85	
				H 41.18	
2	Cod-liver oil	6472	9306 (M)	F 36.69	
				H 36.62	
		6475	9332 (M)	F 35.77	
				H 37.54	37.59
		6473	9315 (F)	F 36.12	
				H 40.14	
		6476	9340 (F)	F 37.90	
				H 39.96	
3	Halibut-liver oil + milk	6472	9305 (M)	F 39.38	
				H 38.89	
		6475	9331 (M)	F 38.75	
				H 38.58	39.48
		6473	9314 (F)	F 41.05	
				H 39.83	
		6476	9339 (F)	F 40.72	
				H 38.65	
4	Virol	6472	9307 (M)	F 36.97	
				H 39.22	
		6475	9333 (M)	F 35.78	
				H 38.09	38.70
		6473	9316 (F)	F 40.10	
				H 42.92	
		6476	9341 (F)	F 38.28	
				H 38.26	

There is no significant difference between the average ash contents of the four groups, and they are all very much below the normal (which is 50 to 55 per cent.) for rats of their age and weight, although two groups at least received abundance of vitamin D. It seems highly probable, therefore, that none of the rats received enough calcium or phosphorus, or both, for normal calcification to take place. This was an alarming possibility. It has been generally recognized that the value of fresh milk as a food is partly due to its calcium and phosphorus content, but it had not seemed possible to us that the ordinary mixed poorer-class diet could be so seriously deficient in these elements as to reduce the percentage of ash in the bones of growing rats from 55 to 40 per cent. in six weeks. Another experiment was therefore carried out to determine whether it really was a shortage of calcium and phosphorus in the diet that had led to the low calcification.

Second General Nutrition Experiment on Rats

Six groups of eight rats (five males and three females), weighing about 40 grammes each, were fed for five weeks on the same diet as the rats in the first experiment, each rat being housed in a separate cage with a grid raised one inch above the floor. The same Bloomsbury tap-water was supplied daily. Each rat in every group was given six drops (approximately 0.12 gramme) of a good sample of cod-liver oil daily directly into its mouth. One group received no other supplement, three groups were given graded amounts of a mixture of salts containing calcium and phosphorus, and two groups had different amounts of milk.

The salt mixture was made up of the salts which contained calcium and phosphorus in Steenbock's salt mixture No. 40, in the proportion in which they occur there. It therefore consisted of:

	grammes
Disodium hydrogen phosphate, $Na_2HPO_4.12H_2O$	35.8
Dipotassium hydrogen phosphate, K_2HPO_4 ..	69.6
Calcium phosphate, $Ca_3H_4(PO_4)_2.4H_2O$	68.8
Calcium lactate, $C_6H_{10}O_6Ca.5H_2O$	15.4
	189.6

These salts constitute about 75 per cent. of Steenbock's salt mixture No. 40, and as this mixture furnishes abundance of calcium and phosphorus when supplied as 4 per cent. of the diet for vitamin A or B_1 tests, 3 per cent. of the new salt mixture should provide plenty of calcium and phosphorus when given to rats receiving a mixed diet. Assuming a young rat eats 5 to 6 grammes dry weight of food per day, he should be given 0.15 to 0.18 gramme of salt mixture to supply the necessary calcium and phosphorus. The salt mixture contains 9.5 per cent. calcium and 14.8 per cent. phosphorus; therefore 0.18 gramme of mixture would furnish 0.017 gramme calcium and 0.027 gramme phosphorus daily. The supplements given to the different groups of rats were thus:

Group 1: No supplement.
Group 2: 0.02 gramme salt mixture daily.
Group 3: 0.06 gramme salt mixture daily.
Group 4: 0.18 gramme salt mixture daily.
Group 5: 5 ml. pasteurized milk daily.
Group 6: Pasteurized milk *ad lib.* (average 13.6 ml. daily at the beginning of the experiment, up to 20 ml. later).

The doses of salt mixture were given in separate dishes, mixed with a little dextrin and moistened with water to prevent scattering. The rats took their portions readily. Group 1 received a similar amount of dextrin.

Result of Second Experiment

(*a*) *Increase in Weight.*—The effect of the supplements on the increase in weight of the groups of rats may be seen in Table IV. The groups were very small, consisting of five males and three females each, therefore slight differences in averages cannot be considered seriously. Thus the supplements of the salt mixture cannot be regarded as having had any influence on the increase in weight of the rats, but the milk supplements certainly had a beneficial effect. It is, of course, impossible to say which constituent of the milk it was that made good a deficiency in the mixed diet. It may have been the proteins of high biological value or some part of the vitamin B complex. It would not be the vitamin A or D content, as the rats were receiving so much of both of these factors in their doses of cod-liver oil that a little more could not have any effect. The mineral content of the milk will be considered in the next section of the results.

TABLE IV.—*Average Increases in Weight of Groups of Rats (five male and three female) given a "Poorer-class" Diet plus a Liberal Dose of Cod-liver Oil Daily, and, in addition, Graded Doses of a Calcium-Phosphorus Salt Mixture or Graded Doses of Pasteurized Milk Respectively.*

Group	Supplement	Average Increase in Weight in Five Weeks (grammes)		Average Increase in Weight of Males and Females (grammes)	
		Males (5)	Females (3)	Weighted Means	Means as if from Equal Number of Males and Females
1	None	52.0 (4 only)	47.3	50.0	49.65
2	0.02 gm. salt mixture	53.2	55.7	54.1	54.45
3	0.06 gm. „ „	55.8	51.7	54.3	53.75
4	0.18 gm. „ „	54.7	63.5 (2 only)	57.2	59.10
5	5.0 ml. milk ..	76.6	80.3	78.0	78.45
6	Milk *ad lib.*, average 13.6 ml. during the first three days; unmeasured later, but less than 20 ml.	120.0	80.3	105.1	100.05

(*b*) *Calcification of Bones.*—The percentage of ash in a dry fat-extracted femur and humerus of each rat was determined in the usual way. The results are shown in Table V.

It is quite evident that the mixed diet similar to that of the poorer classes is seriously deficient in calcium and phosphorus. The bones of the rats receiving the mixed diet plus liberal amounts of cod-liver oil contained only 39.70 per cent. of ash, which is similar to the results found in the first experiment. The addition of graded quantities of a mixture of salts containing calcium and phosphorus brought about increased calcification, the greater the dose of salt mixture given the greater being the calcification of the bones. The highest dose of salt mixture produced 52.12 per cent. of ash, which may be considered a normal amount for rats of their age.

The small dose of milk, 5 ml. daily, produced an ash content of 45.74 per cent., slightly less than that obtained from the addition of 0.06 gramme of the salt mixture. The high dose (20 ml. daily, of which 2 or 3 ml. was generally left) produced an ash content, 52.03, equal to that yielded by the highest dose, 0.18 gramme, of salt mixture. Unfortunately no determination of the calcium and phosphorus content of the milk given to the rats was made, but the following calculation leads to an instructive conclusion.

Apparently 5 ml. of the milk contained less calcium than 0.06 gramme of the salt mixture given. We may suppose that 5 ml. of the milk had as much calcium as 0.04 gramme of the salt mixture—that is, 0.0038 gramme. Therefore the milk apparently contained 0.76 gramme of calcium per litre. This result seems to have some bearing on the question of the availability of the calcium in milk. It is generally stated that milk owes a great part of its value as an antirachitic agent not merely to its high calcium content but to the fact that the calcium is present in a specially available form. Now the average calcium content of milk is 1.12 grammes per litre. The milk used in this experiment apparently contained 0.76 gramme per litre, judging from the effects produced on different groups of rats given 5 ml. of milk and known graded amounts of calcium respectively. Now, if the calcium of the milk were more easily available than the calcium of the salt mixture a *smaller* amount of calcium than 0.0038 gramme in 5 ml. of milk

TABLE V.—*The Percentage of Ash in the Dry Extracted Bone (Femur and Humerus) of the Rats of Each of the Groups 1, 2, 3, 4 5, and 6*

Group	Supplement	Litter	Rat	Ash in Dry Extracted Bone	Average Ash Content
				%	%
1	None	6951	2627 (M)	F 40.18	
				H 39.30	
		6952	2631 (M)	F 40.14	
				H 37.22	
		6958	2567 (M)	F 39.34	
				H 40.00	
		6960	2675 (M)	Died	39.70
		6978	2777 (M)	F 40.00	
				H 38.71	
		6963	2703 (F)	F 37.95	
				H 36.19	
		6983	2813 (F)	F 38.95	
				H 40.35	
		6984	2816 (F)	F 44.21	
				H 43.24	
2	0.02 gm. salt mixture	6951	2626 (M)	F 42.26	
				H 41.15	
		6952	2636 (F)	F 43.25	
				H 41.93	
		6958	2658 (M)	F 41.94	
				H 41.84	
		6960	2676 (M)	F 40.52	
				H 40.73	42.83
		6978	2776 (M)	F 43.37	
				H 45.24	
		6963	2704 (M)	F 42.12	
				H 44.56	
		6983	2812 (F)	F 43.10	
				H 43.41	
		6984	2817 (F)	F 45.94	
				H 43.97	
3	0.06 gm. salt mixture	6951	2625 (M)	F 48.74	
				H 50.00	
		6952	2632 (M)	F 48.22	
				H 49.00	
		6958	2659 (M)	F 45.49	
				H 47.53	
		6960	2677 (M)	F 45.84	
				H 46.28	48.33
		6978	2775 (M)	F 46.71	
				H 49.86	
		6963	2705 (F)	F 49.21	
				H 47.10	
		6983	2811 (F)	F 48.09	
				H 47.80	
		6984	2818 (F)	F 50.71	
				H 52.62	
4	0.18 gm. salt mixture	6951	2624 (M)	F 50.30	
				H 52.79	
		6952	2635 (F)	F 54.49	
				H 54.11	
		6958	2660 (M)	F 50.23	
				H 47.98	
		6960	2678 (M)	F 52.35	
				H 50.73	
		6978	2780 (F)	Died	52.12
		6963	2706 (M)	F 52.66	
				H 54.11	
		6983	2810 (F)	F 52.73	
				H 51.30	
		6984	2815 (M)	F 52.50	
				H 53.36	
5	5 ml. milk	6951	2623 (M)	F 44.78	
				H 47.46	
		6952	2634 (F)	F 45.47	
				H 46.60	
		6958	2661 (M)	F 44.04	
				H 42.63	
		6960	2679 (M)	F 43.89	
				H 42.82	45.74
		6978	2778 (F)	F 47.77	
				H 47.81	
		6963	2707 (M)	F 43.78	
				H 44.28	
		6983	2808 (M	F 44.38	
				H 45.61	
		6984	2819 (F)	F 49.21	
				H 51.23	
6	Milk *ad lib.*	6951	2622 (M)	F 49.72	
				H 50.00	
		6952	2633 (M)	F 47.82	
				H 48.06	
		6958	2662 (M)	F 53.54	
				H 55.85	
		6960	2680 (M)	F 52.07	
				H 51.33	52.03
		6978	2779 (F)	F 56.39	
				H 58.40	
		6963	2708 (F)	F 52.53	
				H 55.83	
		6983	2809 (M)	F 48.09	
				H 47.15	
		6984	2820 (F)	F 52.22	
				H 53.40	

would have produced the effect obtained. But it is very unlikely that our milk contained much less than 0.76 gramme of calcium per litre, since the average value is 1.12 grammes. Therefore it seems highly probable from this experiment that the calcium of milk is no more easily available to the rat than is the calcium of inorganic salts. This point will be investigated by direct experiment later.

Each day during the first and fifth weeks a typical ration for a rat was dried at 100° C. The seven weekly rations were bulked separately. The dry weight of the first week's ration was 100 grammes and of the fifth week's ration 85 grammes. As an excess of bread was given each day these amounts exceeded the quantity of food eaten by each rat daily. The first week's ration contained 40.5 mg. calcium and 157 mg. phosphorus. The fifth week's ration contained 26.2 mg. calcium and 165 mg. phosphorus. The averages of these—33.3 mg. Ca and 161 mg. P—may be taken as an approximation of the average weekly supply of calcium and phosphorus to each rat, and 4.8 mg. Ca and 23 mg. P as the average daily supply. The amounts eaten would be somewhat less than these, as a little white bread was always left. The London tap-water was found to contain 6.38 mg. calcium per 100 ml. Thus a rat drinking 15 c.cm. of water daily would obtain about 1 mg. Ca per day or 7 mg. per week from this source. The amounts of calcium received by the rats of the first four groups would then be:

Group	Mg. Calcium Received per Rat per Day from			
	(*a*) The Diet	(*b*) Tap-water	(*c*) Supplement	Total
1	4.8	1	0	5.8
2	4.8	1	1.95	7.75
3	4.8	1	5.85	11.65
4	4.8	1	17.55	23.35

Since the medium dose of calcium salts was not sufficient to bring about perfect calcification and the highest did so, the amount of calcium needed for perfect calcification must lie somewhere between the two. A curve relating the average ash content of the groups and the quantities of calcium received indicates that the amount of calcium required by the rat for perfect calcification is about 15 mg. a day, which is some two and a half times the amount that the rats received from their diet without any supplement.

Leitch (1937) in a long review on the determination of the calcium requirements of man has concluded that a child of 2 to 9 years needs 0.9 gramme of calcium per day. The amount obtained by a child from the diet described here may be estimated from the following consideration. Assuming the ratio of the calorie intake of the child to that of the young rat (as in this experiment) to be 75:1, as calculated in the early part of this paper, the child would receive 360 mg. of calcium per day from the diet, and, assuming he drank two pints of water a day, he would receive about 70 mg. of calcium from the water. This makes a total of 430 mg. of calcium actually received, and he needs 900 mg.

Summary

A comparison of (*a*) cod-liver oil, (*b*) halibut-liver oil plus dried milk, and (*c*) virol, given as supplements to different groups of young rats fed liberally with a mixed diet of white bread, potatoes, cabbage, margarine, jam, tea, a little butter, milk, brown bread, sausage, etc.,

failed to confirm the results obtained by Simpson and Wood (1935) in a similar experiment on children. As judged by the increase in weight of the rats, the cod-liver oil had a decidedly beneficial effect, the halibut-liver oil plus dried milk had a slightly better effect, whilst the virol was almost without influence as compared with the control rats receiving no supplement. As judged by the percentage of the ash content of the bones of the rats, all three supplements were equally without effect. This suggested that the mixed diet was deficient in the elements required for calcification.

A second experiment was carried out on six groups of rats, all of which were fed liberally with the same mixed diet and given six drops each of a good sample of cod-liver oil daily—a very large dose for a rat. One group received no other supplement, three were given graded doses of a mixture of salts of calcium and phosphorus, and two had graded doses of milk.

The salt mixture had no significant influence on the increase in weight of the rats, but the doses of milk had a distinctly beneficial effect.

The graded doses of salt mixture produced graded results in the percentage of ash in the bones, ranging from 42.83 per cent. for the lowest dose (0.02 gramme) to 52.12 per cent. for the highest dose (0.18 gramme), which is about the normal percentage for rats such as these. The bones of the rats given no supplement contained 39.7 per cent. ash. This proves quite clearly that the ordinary mixed diet of the poorer classes is seriously deficient in the elements required for the calcification of bone.

The lower dose of milk, 5 ml., produced 45.74 per cent. of ash in the rats' bones; the higher dose, about 15 to 16 ml., produced 52.03 per cent. of ash. A comparison of the submaximal effects from the lower dose of milk and the lower doses of salt mixture showed that the milk apparently contained 0.76 gramme of calcium per litre. As this is less than the average calcium content (1.12 grammes per litre) of cows' milk it is concluded that the calcium of cows' milk is no more easily available for the rat than the calcium of inorganic salts.

The serious shortage of calcium in the mixed "poorer-class" diet was confirmed by analysis of typical bulked days' rations as given to the rat.

REFERENCES

Leitch, I. (1937). *Nutr. Abstr. Rev.*, **6**, 553.

Nutrition. Report of conference between representatives of the Advisory Committee on Nutrition and representatives of a committee appointed by the British Medical Association. Ministry of Health, 1934.

Simpson, T. W., and Wood, E. C. (1935). *Med. Off.*, **53**, 125, 135.

The Ministry of Labour has published new editions of pamphlets dealing with the Local Government Services and Social Work for Women, which are Nos. 21 and 22 in the Choice of Career Series. This series is compiled by arrangement between the Incorporated Associations of Headmasters and Headmistresses and the Ministry of Labour. The Local Government Service includes opportunities for those who qualify as accountant, architect, barrister, doctor, engineer, solicitor, surveyor, and teacher. The branches of social work include hospital almoner, labour management, factory inspector, club leadership, occupational therapy, church work, policewoman, and probation officer. Full information is given of the nature of each type of work, the qualifications and training required, the cost of training, and the prospects of advancement. The pamphlets are on sale at H.M. Stationery Office and through any bookseller at the price of 4d. each (5d. post free).

SONNE DYSENTERY

BY

REGINALD MILLER, M.D., F.R.C.P.

Physician to St. Mary's Hospital and Paddington Green Children's Hospital

Although for some years Sonne dysentery has been known in paediatric circles as one of the bugbears of children's hospitals, there are many busy practitioners who have seen nothing of the disease and remain unfamiliar with its characteristics. In view of the present epidemic in London and the home counties a brief account of the disease may perhaps be considered opportune.

Bacillary dysentery may be described with sufficient accuracy as consisting of three types, due respectively to (*a*) the Shiga bacillus, (*b*) the Flexner group of bacilli, and (*c*) the Sonne bacillus. The differentiation of these three types is ultimately a bacteriological matter, but clinically there are important general differences between them. Shiga dysentery, the most serious and fatal type, is practically non-existent among the ordinary population of London, and probably of the country: in seventeen years no example of this infection has occurred at the Paddington Green Children's Hospital. Flexner-group dysentery, as compared with Sonne dysentery, is less common but more severe, prolonged, and dangerous. Sonne dysentery, with which we are here concerned, is therefore the commonest of the three types but runs the mildest and shortest course.

Epidemiological Features

Sonne dysentery, although probably commonest in the summer months, may occur at any time of the year. No age is exempt from it, and while it is most frequently seen in young subjects, infants do not seem to be preponderatingly affected. In these two particulars it differs from the so-called epidemic gastro-enteritis, which is essentially a summer disease and strictly confined to infants.

The disease spreads with such ease and rapidity that it is tempting to think that transmission may be by air-borne infection. There is, however, as yet no clear proof that transmission can occur by any means other than the ingestion of the specific bacillus, the ultimate source of which is the infectious faeces of the patient. Thus, as in typhoid fever, patients and those in attendance on them must be regarded as the source of contamination of food, drink, feeding utensils, etc. Transmission in the same way by flies is a possibility.

Outbreaks of Sonne dysentery usually arise in a children's ward from the admission of a case in which the stools are not typical of the disease on inspection. Thus very mild cases and convalescent cases constitute the chief danger. D. Nabarro and A. G. Signy (1932) report that children who have recovered from an attack may continue to pass Sonne bacilli in the faeces "for months." This must, I think, be very rare, and it does not seem that the *chronic* carrier constitutes a problem of importance among children. The bacilli may disappear from the stools within as short a time as ten days from the onset of symptoms, and in my experience, in the absence of any relapse, tests have always proved negative by the end of three or four weeks. The incubation period is from one to eight days, usually two or three days.

Morbid Anatomy

Necropsies on cases of Sonne dysentery are so rare that I have not been able to obtain any first-hand information

on the morbid anatomy of the disease. Doubtless there is an inflammatory congestion of the mucosa of the colon, and the character of the symptoms suggests that this may be at its most severe in the lowest part of the intestine. The conspicuous presence of blood in the motions must indicate some degree of superficial ulceration of the mucosa, but the rapid recovery which ensues makes it clear that there can be no gross ulcerative changes.

Clinical Features

Describing first a typical case, the disease develops with great rapidity, with the onset of fever up to 102–3°, abdominal pain with colic and perhaps tenesmus, and purging. The stools are loose and contain obvious quantities of blood and mucus. Pus is also present on microscopical examination. The passage of blood and mucus without faecal material is exceptional, but may occur in between the typical actions. The bowels during the first twelve hours are moved perhaps every hour, or even more frequently. Abdominal pain may be severe, but is not excruciating as in intussusception. Vomiting may be absent throughout; but it is common at the early stage of the disease for some vomiting to occur with each action of the bowels, clearly due to the general intestinal turmoil going on. In exceptional cases (*vide infra*) vomiting is a prominent symptom. By the second day the more violent symptoms are subsiding, and by the end of the third day the temperature is falling rapidly, the blood is disappearing from the stools, pain is lessening and the number of stools is diminishing. The patient is left feeling considerably weakened by the attack. The constitutional disturbance seems to arise not so much from toxaemia as from dehydration, loss of sleep, and starvation. For the next few days some mild diarrhoea remains, the motions being unformed and showing the presence of some mucus; blood, however, is only now to be found by microscopical examination, and even this soon disappears. From this time onwards there is usually rapid recovery, so that by the end of about ten days from the onset the child is as well as before the attack.

In mild cases the symptoms are less severe and the motions, although containing mucus, may show no obvious blood; but on microscopical examination blood and pus cells are constantly to be seen. A similar condition of the stools may be found in cases convalescent from a typical attack, and in both these conditions there is considerable danger that the true nature of the disease may pass unrecognized.

In exceptional cases vomiting may apparently be troublesome, and R. E. Smith (1931) has raised the question whether there may not be a gastric type of Sonne infection. Further observations are required to settle this point, but it might well be kept in mind in connexion with epidemics of unexplained vomiting, especially in institutions.

Course and Prognosis

The usual short course of the disease has been described. Relapses within a week of recovery are occasionally seen. Complications and sequelae seem to be practically unknown. The length of time during which the stools may remain infectious has been discussed. Danger to life may arise in the case of weakly infants who acquire the disease; otherwise the infection appears to carry no death rate.

Diagnosis

The clinical diagnosis of Sonne dysentery is not difficult in typical cases. In infants and young children intussusception must be considered. This is essentially an obstructive condition, whereas Sonne dysentery is a diarrhoeic disease and pus is present in the stools. Further, the positive points in favour of intussusception are absent in dysentery—namely, the characteristic temporary collapse with the crises of abdominal pain, the presence of a tumour felt through the abdominal wall or per rectum, and the diagnostic radiographic picture with an opaque enema. In older children and adults Sonne dysentery has to be distinguished from other forms of infective diarrhoea and food poisoning, and this rests upon the bacteriological examination of the stools. The danger of overlooking mild, convalescent, and atypical cases has been emphasized.

The bacteriological diagnosis of the disease is of the utmost importance, and a reliable report can be obtained in eighteen hours. A swab may be taken of the rectal mucosa, in which case the specimen must reach the bacteriologist with practically no delay; but usually a specimen of the faeces is submitted to examination. Here again it is important that the specimen should be as fresh as possible, and although it is difficult to lay down a precise rule I should not myself rely upon a negative report if the stool were twenty-four hours old before being planted out. In order to obtain as satisfactory and pure a growth of the bacillus as possible a piece of mucus is picked out of the stool, gently washed free of faecal material in normal saline, and spread by means of a swab over a small area of a warm dry plate of lactose–litmus–bile-salt–agar or similar medium. Any surplus material is removed from the surface, and from this area, by means of a spreader, the rest of the plate is planted out by quartering. Eighteen hours later a suspicious colony is removed and emulsified in water on a slide. A loopful of Oxford specific agglutinating serum for the Sonne bacillus is added, and if the test is positive macroscopic clumping is seen within a minute. Confirmatory sugar reactions will take an additional twenty-four hours, but in expert hands the results of the Oxford serum tests seem entirely reliable. A similar technique with other types of Oxford sera leads to the recognition, if needed, of Flexner-group and Shiga dysentery, the typhoid and paratyphoid, Gaertner and *aertrycke* infections. Sero-diagnosis from the patient is not helpful, at all events in early stages of the disease.

Treatment

Sonne dysentery is a notifiable disease. Preventive measures to check its spread can hardly be relied upon to be completely successful. In the early and most contagious phase of the infection the patient may require attention every half-hour, and in practice it seems impossible to institute measures which will with certainty prevent the infection of other children in a ward. Where practicable, therefore, the patient should be isolated. When this cannot be done those in attendance on the patient must not handle other children, and in particular must have nothing to do with the preparation of their meals. To protect herself the nurse should wear surgical gloves. In houses the lavatory should not be used by infected people. It is customary to obtain three negative tests of the stools before regarding the case as free of infection.

Remedial treatment should be undertaken in the expectation that the worst of the disease will be over in three days. Thus the indications are to relieve pain and prevent dehydration. The customary anti-dysenteric treatment by repeated doses of sodium and magnesium sulphates does

neither of these things and is best avoided, nor should any other form of aperient be prescribed. Opium is the most useful drug in cases of this disease, and it may be taken with bismuth or a reliable brand of kaolin. Fluids should be given so far as the vomiting permits, and as soon as there is a desire for food a bland diet may be ordered. In debilitated patients special measures to combat the dehydration may be required. The use of anti-dysenteric serum is neither necessary nor of value in cases of Sonne dysentery.

REFERENCES

Nabarro, D., and Signy, A. G. (1932). *Arch. Dis. Childh.*, **7**, 327.
Smith, R. E. (1931). *Lancet*, **2**, 925.

THE ABSENCE OF ANTI-GONADOTROPIC SUBSTANCES IN THE BLOOD SERUM OF MAN INJECTED WITH GONADOTROPIC EXTRACTS

BY

A. W. SPENCE, M.A., M.D., F.R.C.P.
Assistant Physician, St. Bartholomew's Hospital

E. F. SCOWEN, M.D., M.R.C.P.
Assistant Physician and Assistant Director, Medical Professorial Unit, St. Bartholomew's Hospital

AND

I. W. ROWLANDS, Ph.D.
National Institute for Medical Research, Hampstead

Recent work has demonstrated that the prolonged administration of gonadotropic hormones to animals produces a state of insensitivity, so that the initial hypertrophy of the gonads disappears and may even be followed by atrophy (Collip, 1934). Moreover, the serum of an animal injected for about three months with a gonadotropic extract acquires the property of inhibiting the action of the gonadotropic extract when both are separately injected into a test animal, such as the immature rat; when the serum alone is injected into a normal adult animal it may cause atrophy of the reproductive organs (Rowlands, 1937). These phenomena are due to the production of anti-gonadotropic substances in the blood as a result of the continued administration of the gonadotropic extract.

These facts might be of clinical importance in the treatment of patients for a prolonged period with gonadotropic hormones. Should such anti-gonadotropic substances be formed in the human it would appear advisable to intersperse rest periods of several months, during which the patient receives no treatment, to enable him to reacquire sensitivity and to prevent any possible damage to the gonads. On the other hand, should there be no indication of the production of such substances as a result of prolonged treatment these rest periods would be unnecessary. In the elucidation of this problem samples of blood from nine patients with undescended testes who were receiving treatment with gonadotropic hormones were tested for anti-gonadotropic activity.

Methods

The patients were injected intramuscularly twice a week with extracts of human urine of pregnancy (pregnyl or antuitrin S) or with extracts of pig anterior pituitary (ambinon or antuitrin gonadotropic). Details of their treatment are given in Table I.

TABLE I.—*The Treatment of the Patients with Gonadotropic Preparations*

Case No.	Age (Years)	Preparation	Dose (Rat Units, R.U.) twice weekly
1	19	Pregnyl	1,000
2	12	Pregynl	500 for first 9 weeks, then 1,000
7	14	Pregnyl	1,000
8	20	Pregnyl	1,000
9	12	Pregnyl	500
10	14	Pregnyl	500
5	13	Antuitrin S	200
3	14	Ambinon	50
4	10	Antuitrin gonadotropic	30 for first 14 weeks, then 50 for 9 weeks

Where possible a sample of blood was obtained before treatment and thereafter at intervals of one to two months for as long as was practicable in each case (Table II). About 20 c.cm. of blood was obtained from the basilic vein, and kept in a sterile flask at 0° C. until the following morning, when the serum was separated. The activity of the serum was measured by its capacity to neutralize, in the immature rat, the power of a gonadotropic extract similar to that injected into the patient. Each sample of serum and gonadotropic extract was injected into a group of five immature female rats (40–50 grammes) once daily for five days; the two injections were given on opposite sides of each animal. The rats were killed twenty-four hours after the last injection, and the ovaries dissected, fixed in Bouin's fluid, and weighed the following day from 70 per cent. alcohol.

A gonadotropic extract from human urine of pregnancy (UP10) was used in testing, of which a total dose of 1 mg., divided over five days, produces ovaries weighing 35 mg. in the immature rat. The weight of the normal ovaries of rats of this body weight is 10–12 mg. The activity of the other extracts used is given in Table II.

TABLE II.—*The Effect of Serum from Patients Treated with Gonadotropic Extracts on the Action of Similar Extracts on the Immature Rat Ovary*

Case No.	Date of Sample after First Injection (Weeks)	Assay			
		Substance	Amount (mg.)	Amount of Serum (c.cm.)	Weight of Rat Ovaries (mg.)
1	0	UP10	1	1.25	34
1a	5	,,	1	1.25	44
1b	11	,,	1	1.00	27
2	11	UP10	1	1.25	40
2a	15	,,	1	2.00	33
2b	19	,,	1	1.50	22
2c	25	,,	1	1.90	26
2d	29	,,	1	1.50	30
7	7	UP10	1	1.50	29
8	13	UP10	1	1.00	39
8a	20	,,	1	0.80	47
8b	28	,,	1	0.75	32
9a	6	UP10	1	1.00	34
9b	13	,,	1	1.00	34
5	0	—	—	1.50	12
5a	4	UP10	1	0.75	32
5b	10	,,	1	1.00	39
—	—	Saline extract of pig	1 gm.	—	43
3	16	Ant. pit.	1 gm.	1.25	65
—	—	AP43D	25	—	27
3a	21	,,	25	1.50	44
—	—	AP44	25	—	32
3b	26	,,	25	1.50	35
4a	13	AP43D	25	0.75	32
4b	19	AP44	25	1.90	39
—	—	AP51	25	—	21
9 & 10	0	,,	25	2.50	27

Results

Serum of Patients Injected with Human Urine of Pregnancy Extracts.—The results of these assays (Table II) show that no appreciable amount of anti-gonadotropic substance is formed in response to the prolonged administration of either pregnyl or antuitrin S. The serum of Case II, which was tested most frequently, showed after nineteen weeks of injections a slight anti-gonadotropic activity, in that it inhibited, in an amount of 1.5 c.cm., the activity contained in about 0.5 mg. of the extract UP10. No further production was found in samples taken at a later date, in spite of the continued injections. This amount of anti-gonadotropic substance is very slight in comparison with that formed in other species receiving continued injection of this material (Rowlands and Parkes, 1937). Direct comparison is difficult, on account of the difference in the amounts given and the method of administration. The development of this small amount of anti-gonadotropic activity might be explained on the assumption that the pregnyl had been denatured to such an extent in its preparation as to become slightly antigenic to man.

These results confirm the work of Twombly (1936) and are in keeping with those of Thompson (1937) and Rowlands (1937a), who failed to produce "anti-hormone" activity in the blood of sheep that had been injected for prolonged periods with sheep pituitary extracts: they uphold the view of the true antibody nature of "anti-hormones."

Serum of Patients Treated with Pig Pituitary Extracts.—The serum of the patient (Case 3) treated with ambinon for sixteen weeks appeared to augment the gonadotropic activity of a saline extract of pig pituitary. When the test was repeated after twenty-one weeks of treatment the serum again appeared to enhance the activity of an extract made from acetone-desiccated pig pituitary (AP43D). A final sample of serum taken five weeks later failed either to augment or to inhibit the action of ambinon (AP44). The injection together with ambinon (AP51) of serum obtained before treatment (Cases 9 and 10) did not increase the effect of the extract on the rat ovary. Very doubtful augmentary effects were given by the serum of the patient (Case 4) treated with antuitrin gonadotropic.

The significance of an augmentary action, such as seems to be shown by these sera, is discussed elsewhere (Rowlands, 1937a).

Summary

No serious amount of anti-gonadotropic activity was demonstrable in the serum of patients receiving gonadotropic extracts of either human urine of pregnancy or pig pituitary for varying periods up to seven months. From this we conclude that in the treatment of undescended testes and other disabilities the administration of gonadotropic hormones may be continued for a considerable period without fear of inducing a phase of insensitivity and damage to the gonads by anti-gonadotropic substances.

We wish to thank Dr. J. Stanley White, of Messrs. Parke, Davis and Co. Ltd., for supplies of antuitrin S and antuitrin gonadotropic, and Dr. A. N. Macbeth, of Organon Laboratories, for supplies of pregnyl and ambinon.

Bibliography

Collip, J. B. (1934). *J. Mt. Sinai Hosp.*, N.Y., **1**, 28.
Rowlands, I. W. (1937). *Proc. roy. Soc.*, B, **121**, 517.
—— (1937a). In press.
—— and Parkes, A. S. (1937). *Lancet*, **1**, 924.
Thompson, K. W. (1937). *Proc. Soc. exp. Biol.*, N.Y., **35**, 634.
Twombly, G. H. (1936). *Endocrinology*, **20**, 311.

THE WATER REQUIREMENTS OF SURGICAL PATIENTS*

BY

D. L. C. BINGHAM, F.R.C.S.Ed.

Clinical Tutor, Surgical Out-patients Department, Royal Infirmary, Edinburgh

This paper is a preliminary survey of the metabolism of the surgical patient during the immediate post-operative period, and is based upon results obtained while investigating the water balance of such subjects. It became evident very early in the investigation that water metabolism is only one of the many metabolic processes occurring in the surgical patient of which knowledge is far from complete. In this paper only water metabolism will be discussed; other aspects of metabolism will merely be noticed as each becomes relevant.

Water is essential for all the physiological processes of the animal organism, and the regulation of its intake and output is finely adjusted. This delicate regulation of intake and output is called water balance. In spite of its importance, only in the last ten years have accurate investigations been made into this subject, and although much is already known the water exchanges of the ill patient abound in unsolved problems. The researches of Maddock and Coller; Newburgh, Wiley, and Johnstone; and Lavietes, Harrison, and Peters are all of the first importance, and should be consulted by students of the subject.

It is estimated that water forms from 65 per cent. to 70 per cent. of the body weight. This water is distributed in approximately the following proportions:

		Per cent. body weight
Extracellular fluids :	(1) Blood stream	9
	(2) Interstitial tissues	16
Intracellular fluid		45
Total		70

The functions of the extracellular fluids are threefold: to carry foodstuffs to the cells; to carry waste products away from the cells; and to regulate the stability of certain physico-chemical conditions in the body—*p*H, osmotic pressure, temperature, etc. For the perfect performance of these functions there is an optimum volume of the extracellular fluids, and departures from this optimum in either direction prejudice and may even threaten the actual life of the body cells. Alterations in the body fluids are largely made up of changes in the extracellular fluids, the intracellular fluids remaining comparatively constant until the approach of death.

The Study of Water Metabolism

Water metabolism may be studied by direct or by indirect methods. The direct method requires a knowledge of the following:

1. Water content of the fluids drunk.

2. Water content of ingested foods which may vary from 5 per cent. to 95 per cent.

3. Water formed by oxidation of this food.

4. Calorie output from its oxidation. (In this investigation it has been assumed that all the food ingested has been completely absorbed and metabolized.)

5. The approximate calorific requirements of the subject. (In the investigation the Douglas bag method was adopted, with due regard to its serious potential error when applying

* Report of work done while in receipt of a British Medical Association research scholarship.

five-minute readings to the whole twenty-four-hour period. Also it was sometimes impossible to obtain results because the patients would not tolerate the procedure.)

6. If, as is the rule in the ill patient, the calorie requirements are not met by the food intake, then the water formed from the oxidation of body tissues must be estimated. This requires a knowledge as to which of the body constituents are providing the necessary energy, in itself a laborious investigation.

7. The solid intake.

8. The solid output in the urine, faeces, sputum, vomitus, and other discharges. (The solids lost in the sweat have been ignored.)

9. The fluid output in the urine, faeces, and insensible perspiration from the skin and lungs. (Insensible perspiration and insensible loss of weight are not the same. Insensible perspiration implies lost water only. Insensible loss of weight is equal to lost water plus carbon dioxide minus gained oxygen, and varies with the respiratory quotient. In this paper insensible perspiration has been taken to be equal to insensible loss of weight.)

10. The body weight under standard conditions of nudity, after emptying the bladder, and at fixed times during the day.

The direct method of estimating water balance may be expressed in the following two equations:

1. Change in weight = {solids in / fluids in} − {solids lost (urine, faeces, vomitus, etc.; body solids metabolized) / fluids lost (urine, faeces, vomitus, etc., insensible perspiration)}

For insensible perspiration this equation may be expressed:

Insensible loss = {solids in / fluids in} − {solids lost / visible fluid lost (urine, faeces, vomitus)} − change in weight

2. Water balance − fluids available {(1) in fluid drunk / (2) in food / (3) formed by metabolism of either food or body tissues} − {visible fluid lost / insensible fluid lost}

Indirect methods are perhaps more complex; they require that a number of no doubt allowable assumptions be made, and are essentially a study of the metabolism of certain electrolytes from which the water exchanges may be calculated (Lavietes, 1935, 1935a). In this investigation the first direct method has been followed.

At this stage it is necessary to study more closely the water gained and lost through the various channels.

WATER GAINED

(*a*) The volume of the fluids drunk varies considerably with the individual. In health from 800 to 2,000 c.cm. may be taken daily. After operations the patient may be able to tolerate only 200 c.cm. or less during the first twenty-four to forty-eight hours without nausea.

(*b*) The metabolic mixture provides in water content and from water of oxidation 1,000 c.cm. to 2,000 c.cm. daily.

During starvation about 500 c.cm. of water becomes available from the tissue katabolism made necessary by the energy requirements.

WATER LOSS

1. *In the Urine.*—The water lost in the urine is the amount which remains after insensible perspiration has withdrawn its quota from the body water available for excretory purposes. It follows, therefore, that if the body is seriously dehydrated the patient is often anuric, and the dehydration should be overcome before other measures are taken to promote the secretion of urine. It is here pertinent to point out that the kidneys are required to excrete daily in health about 35 grammes of waste materials. Unless sufficient water is available for this purpose retention of these waste products occurs. Where renal damage exists more water is required to excrete the same quantity of waste material. The following table is interesting in this connexion:

	Maximum Concentrating Ability	Minimum Water Required to Excrete 35 grammes of Waste Products
	c.cm.	c.cm.
Normal kidneys	1,032—1,029	473
Diseased kidney ..	1,028—1,025	595
	1,024—1,020	605
	1,019—1,015	850
	1,014—1,010	1,439

It follows from these observations that, knowing the degree of renal damage in any given patient, we must never allow the urinary volume to fall below the minimal water volume which is necessary to excrete the patient's urinary waste products. Indeed, as the waste products to be excreted in the post-operative period may greatly exceed 35 grammes, the surgeon's aim must be to ensure that the patient has at least double the above minimal volume of water available for urinary excretion.

2. *In the Faeces.*—On an average 150 c.cm. of water are lost daily in the faeces.

3. *From the Skin and the Breath.*—Normally the volume of water vaporized from the skin and in the breath varies from 800 to 1,500 c.cm. daily; but in abnormal conditions of high external temperature or humidity, or in diseased states such as thyrotoxicosis, fever, etc., these figures may be greatly exceeded. Indeed, as much as 3,500 to 4,000 c.cm. may be lost daily in the breath and from the skin. This water of vaporization is responsible for the thermal control of the body, and dissipates about 24 per cent. of the body heat. Each c.cm. of water requires 0.58 large calorie for its vaporization; therefore, if the insensible water loss be 100 c.cm. it will require 58 calories to effect its vaporization. Owing to its all-important function of temperature regulation the insensible perspiration exercises preferential rights over all water available for excretion. It is not until over 6 per cent. of the body weight has been lost in fluids that any decrease in water vaporized occurs. At this stage the patient is grossly dehydrated, is fevered, is anuric, has sunken eyes, a dry skin, and a dirty dry-leather-like tongue. If water be now given it is retained by the body until the deficit is made good before any becomes available for the restoration of the other excretory processes, such as renal excretion, the faeces, etc.

4. *Loss by Other Channels.*—The loss of water by other channels such as by vomiting and from fistulae, etc., may be great. It is said that severe and rapid dehydration does not occur except by these methods, especially by vomiting. Where there is excessive vomiting, etc., the volume lost must be estimated and added to the fluid intake if water balance is to be maintained.

Results of the Investigation

In the present investigation ten unselected cases were taken, all of which were treated by the usual routine methods of the surgical wards of the Royal Infirmary, Edinburgh. The accompanying table abstracts the pertinent results.

From an inspection of the table it will be seen that:

(*a*) Following operation each patient became increasingly dehydrated during the period of study, the smallest

		Case 1, aged 65. Carcinoma of Stomach. Laparotomy; Inoperable.	Case 2, aged 70. Appendicectomy.	Case 3, aged 48. Carcinoma of Stomach. Laparotomy; Inoperable.	Case 4, aged 43. Carcinoma of Head of Pancreas. Cholecystgastrostomy	Case 5, aged 27. Carcinoma of Pelvic Colon. Colostomy	Case 6, aged 41. Chronic Cholecystitis. Cholecystectomy.	Case 7, aged 47. Right Inguinal Hernia.	Case 8, aged 57. Gastric Ulcer. Partial Gastrectomy.	Case 9, aged 61. Appendicectomy.	Case 10, aged 10. Osteomyelitis Right Femur.
From 9 a.m. of day before operation to 9 a.m. day of operation	State of tongue	Moist	Furred	Dry	Moist	Moist	Moist	Moist	Moist	Moist	Dry
	Thirst	Nil	Slight	Slight	Nil	Nil	Nil	Nil	Nil	Nil	Slight
	Blood chemistry: Urea N_2	22	17	13	16	12	13	17	14	10	13
	Blood chemistry: CO_2 combining power	60	58	60	61	60	56	59	58	60	54
	Calorie needs and R.Q.	2,219 0.89	909? 0.95	1,500? —	1,346 0.67	1,416 0.86	1,518 0.79	1,678 0.82	1,465 0.78	1,851 0.75	962 0.74
	Water intake: By mouth	1,516	540	420	600	911	745	1,317	1,016	965	1,336
	Water intake: From metabolic mixture	289	129	162	20?	170	222	216	203	212	119
	Water intake: By rectum	—	600	1,200	—	1,500	600	600	600	600	—
	Water intake: Intravenous	—	—	—	—	—	—	—	—	—	—
	Water intake: Total available water	1,805	1,269	1,782	620	2,581	1,593	2,133	1,819	1,777	1,480
	Water loss: Urine	1,500	740	455	320	1,490	527	970	680	970	165
	Water loss: Faeces	954	579	1,133	—	747	554	856	749	383	510
	Water loss: Vomitus, etc.	—	—	—	208	173	—	—	—	—	—
	Water loss: Insensible loss	1,383	491?	272?	?	231?	322?	422?	64??	3??	756
	Water Balance	−2,032	−541	+78	?	−60	362?	−115	+326	+421	+59
First day	State of tongue	Dry	Dry	V. dry	Dry	Dry	Dry	Dry	Dry	Dry	V. dry
	Thirst	Marked	Parched	Parched	Great	Moderate	Great	Slight	Great	Great	Great
	Blood chemistry: Urea N_2	24	21	21	20	19	21	17	17	19	17
	Blood chemistry: CO_2 combining power	53	56	47	56	47	42	54	53	47	36
	Calorie needs and R.Q.	2,148 0.69	1,102 0.65	1,500? —	1,500? —	1,239 0.70	1,931 0.73	1,865 0.73	1,930 0.76	1,593 0.67	1,277 0.86
	Water intake: By mouth	712	501	621	368	923	775	1,766	874	390	1,028
	Water intake: From metabolic mixture	224	134	163	171	130	220	239	234	184	155
	Water intake: By rectum	—	180	—	720	—	180	—	—	—	180
	Water intake: Intravenous	—	—	—	—	—	—	—	—	—	—
	Water intake: Total available water	936	715	784	1,259	1,053	1,175	2,005	1,108	574	1,363
	Water loss: Urine	660	—	330	500	—	—	820	250	60	170
	Water loss: Faeces	—	—	156	—	21	—	—	—	—	—
	Water loss: Vomitus, etc.	—	74	—	106	177	66	—	367	—	10
	Water loss: Insensible loss	822	2,019	2,377	1,785	1,379	1,768	1,591	953	972	1,911
	Water Balance	−546 −2,578	−1,378 −1,919	−1,979 −1,901	— −1,132	−524 −584	— −656	−406 −521	−452 —	−452 —	−658 −559
Second day	State of tongue	V. v. dry	V. dry	V. dry	V. dry	V. dry	Dry	Clean	V. v. dry	V. dry	Dry
	Thirst	Parched	Parched	Parched	Parched	Great	Great	Nil	Parched	Parched	Great
	Blood chemistry: Urea N_2	26	25	20	26	25	25	14	24	16	14
	Blood chemistry: CO_2 combining power	49	54	52	51	45	39	57	50	51	48
	Calorie needs and R.Q.	2,100 0.72	1,194 0.56	1,500? —	1,500? —	1,316 0.74	1,525 0.71	1,710 0.77	2,060 0.66	1,414 0.74	974 0.82
	Water intake: By mouth	1,043	961	789	866	960	661	1,565	1,416	1 345	1,321
	Water intake: From metabolic mixture	237	143	168	154	144	173	237	242	165	133
	Water intake: By rectum	300	—	480	360	—	—	—	180	180	—
	Water intake: Intravenous	—	—	—	—	—	—	—	—	—	—
	Water intake: Total available water	1,583	1,104	1,437	1,380	1,104	834	1,802	1,836	1,690	1,454
	Water loss: Urine	770	104	580	1,000	130	170	1,360	590	410	320
	Water loss: Faeces	202	—	433	232	232	—	—	337	400	—
	Water loss: Vomitus, etc.	—	—	—	—	211	—	—	329	—	—
	Water loss: Insensible loss	1,362	1,784	408	750	1,017	1,170	600	532	1,199	1,571
	Water Balance	−751 −3,329	−784 −2,703	+16 −1,885	−602 −1,734	−254 −838	−506 −1,162	−158 −679	−48 −500	−319 −777	−437 −1,036
Third day	State of tongue	V. dry	Dry	V. dry	V. dry	—	Less dry	—	V. v. dry	Dry	Dry
	Thirst	Less	Great	Great	Great	—	Slight	—	Parched	Great	Slight
	Blood chemistry: Urea N_2	27	29	14	27	—	17	—	24	19	11
	Blood chemistry: CO_2 combining power	48	56	56	50	—	48	—	47	54	55
	Calorie needs and R.Q.	2,100 0.72	1,201 0.65	1,500? —	1,500? —	— —	1,503 0.75	— —	1,734 0.68	1,500 0.75	953 0.84
	Water intake: By mouth	1,877	1,007	624	1,804	—	1,436	—	1,280	1,276	1,691
	Water intake: From metabolic mixture	216	141	195	156	—	168	—	185	180	124
	Water intake: By rectum	—	—	180	480	—	720	—	600	180	—
	Water intake: Intravenous	—	—	—	—	—	—	—	1,600	—	—
	Water intake: Total available water	2,138	1,148	999	2,440	—	2,324	—	2,910	1,636	1,815
	Water loss: Urine	210	300	440	790	—	560	—	490	450	1,380
	Water loss: Faeces	359	—	124	537	—	540	—	554	290	405
	Water loss: Vomitus, etc.	—	514	—	—	—	—	—	240	7	—
	Water loss: Insensible loss	1,333	576	488	1,671	—	972	—	2,179	873	712
	Water Balance	+236 −3,565	−242 −2,945	−53 −1,938	−558 −2,292	— —	+252 −910	— —	−553 −1,053	−23 −800	−277 −1,313

negative water balance at the end of the second day after operation being 679 c.cm. and the largest 3,565 c.cm. at the end of the third day. No patient maintained normal water balance. Each case varied considerably, but even with an uneventful convalescence it was not usually until the fifth day that normal water balance was re-established.

(*b*) The insensible water loss was very considerable, especially in the first twenty-four hours, possibly from the effects of the anaesthetic. This insensible water loss was always very great when the patient perspired profusely, and varied from 1,000 to 2,400 c.cm. (1.65 to 4 pints).

(*c*) Coincidently with dehydration there was a noticeable decrease in urinary secretion (even to its abolition); a rise in blood urea nitrogen, indicating waste-product retention; and a decrease in the CO_2 combining power of the blood.

(*d*) Not shown on this table, but coincidently with dehydration and the limitation of the patient's calorie intake, there was very marked katabolism of body protein, to facilitate the katabolism of body fat for energy requirements, as the carbohydrate reserves are rapidly exhausted. Amounts up to 250 grammes of body protein burnt per day were observed in the first twenty-four to forty-eight hours after operation. With the restoration of water balance it was remarkable that this excessive destruction of body protein ceased.

(*e*) Clinically the state of the tongue and oliguria and the subjective sensation of thirst indicate dehydration.

Conclusions

1. Under the existing post-operative regime dehydration occurs, and may be severe.

2. Although each case must be separately considered the minimal fluid intake in the days following operation should be from 3,000 to 4,000 c.cm. a day (approximately 5 to 7 pints), if necessary by the intravenous route. (In a further communication the most suitable fluid will be discussed.)

3. If excessive loss from vomiting, etc., occurs the extra volume of fluids so lost must be added to the amount which the patient in any case requires.

4. Oliguria, thirst, and a filthy dry tongue are a real reproach to the surgeon.

A most pleasant duty is the acknowledgment of my debt to others. To Sir John Fraser for the privilege of working in his wards, and to his staff for their patient help; to the technical staff of the Biochemical Laboratories; and to Professor Melville Dunlop for his unfailing encouragement, my grateful thanks are due.

BIBLIOGRAPHY

Cox, C. I., and Hicks, C. S. (1933). *Austral. J. exp. Biol. med. Sci.*, **11**, 269.
Gamble, J. L. (1936). *Internat. Clin.*, **2**, 184.
Hall, J. F., and McClure, G. S. (1936). *Amer. J. Physiol.*, **115**, 670.
Lavietes, P. H. (1935). *J. clin. Invest.*, **14**, 57.
—— D'Esopo, J. M., and Harrison, H. E. (1935a). Ibid., **14**, 251.
—— Bourdillon, J., and Klinghoffer, K. A. (1936). Ibid., **15**, 261.
Maddock, W. G., and Coller, F. A. (1937). *J. Amer. med. Ass.*, **108**, 1.
Newburgh, L. H., and Johnstone, M. W. (1934). *J. Nutrit.*, **7**, 107.
—— Wiley, F. H., and Johnstone, M. W. (1933). *J. clin. Invest.*, **12**, 1151.
Peters, J. P., Kydd, D. M., and Lavietes, P. H. (1933). Ibid., **12**, 689.
Rusk, H. A. (1937). *Radiol. Rev. and Missi. Valley med. J.*, **59**, 20.
Stewart, J. D. (1936). *New Engl. J. Med.*, **215**, 53.
—— and Rourke, G. M. (1936). *J. clin. Invest.*, **15**, 697.

Clinical Memoranda

Insulin in the Local Treatment of Persistent Septic Cutaneous Conditions

The use of insulin for the treatment of diabetes mellitus is now world-wide, but the extraordinary effect of this substance in securing the cure of persistent cutaneous septic conditions seems up to the present time not to have been realized.

The work of da Costa and others in connexion with the insulin treatment of epitheliomatous ulcers first drew attention to the possibility of using it in cases of chronic cutaneous sepsis that had proved resistant to all other remedies. The following four cases are typical and represent the varying types of septic conditions treated, the clinical features and treatment being given in detail.

ILLUSTRATIVE CASES

Case 1.—A boy aged 14 was involved in a motor accident in October, 1936, and on November 11 following underwent an exploratory operation in the region of the left elbow. Subsequently the wound broke down. Ultra-violet rays and sunlight treatment as well as the usual dressings were tried, with no success. The patient was admitted to the Westminster Hospital for excision of the skin in the region of the unhealed area. This was done and the wound again sutured, but it broke down immediately. The patient was subsequently readmitted for twice-daily dressings. First cod-liver oil was tried and then antipeol, with no success at all. Insulin dressings were started on March 20, 1937, and applied twice daily by the nursing staff. Rapid healing took place, and the patient was discharged on April 8, with the wound closed for the first time since November, 1936. He has been seen since, and has had no further recurrence of the breaking down of the wound.

Case 2.—This patient was seen in the casualty department, which she had been attending for over a month with a septic finger. In spite of all forms of treatment it was getting worse, to the despair of the casualty officers and the sister in charge. I saw it, and suggested that daily insulin dressings should be tried. These were started at once, and within ten days the finger was quite well and the patient had returned to work.

Case 3.—A man aged 57 was first seen by me in March, 1936, with an amputation of the right leg following arteriosclerosis. He had an infected bunion on the left leg opposite the head of the first metatarsal which had ulcerated and was giving him considerable pain. Ordinary dressings were continued until August, 1937—that is, for sixteen months. The patient was in some pain all this time, particularly when he attempted to walk. He came into my hands again on August 27, 1937, when I suggested insulin treatment locally. This was started on August 29, the man dressing the foot himself three times daily with single-strength insulin on gauze. When seen five days later the patient said he was much more comfortable, and one week after this the pain had gone. The ulcer was shallower, and the area of inflammation surrounding it had entirely disappeared for the first time. It is scarcely to be expected that the ulcer will heal, owing to the continual movement and lack of any pulsation in the peroneal and tibial arteries.

Case 4.—A married woman aged 27 was first seen by me on September 14, 1937. Her history was a peculiar one. After working for some time in a blanket factory she found that whenever she knocked herself the bruised place became septic. This condition was a surface inflammation which took a long time to heal, and when it did it left a white scar. Her right arm was covered with these scars. When examined at the Radcliffe Infirmary a diagnosis of low-grade streptococcal infection was made. At the time I saw her she had one of these septic areas on her left arm, irregular in outline and about two inches by one inch in extent, raw, with a yellow-

grey slough, which was apparently typical. Her doctor told me that these areas took about eight to twelve weeks to heal with the paraffin and flavine dressings which had been advised. I asked her when she expected them to have healed, and the patient replied, "By about Christmas. Not much before, I suppose." Insulin dressings, double strength, were started, and as the patient lived in the country these could be applied only once a day. In this case I sprayed the insulin on with a hypodermic syringe, then covered the wound with gauze and again sprayed with insulin. The whole was then covered with mackintosh, wool, and a bandage. One week later, on September 24, the area had healed over.

The effect in every case treated has been so remarkable—a complete cure being the end-result in all except Case 3, and this has been relieved—that the treatment seems at least worthy of further investigation. In only one case, No. 1, was the patient in hospital, where adequately supervised dressings could be applied. No. 2 attended for twenty-four-hourly dressings each morning. The remainder were seen and treated at home, with only medically supervised dressing once a day.

The cost of this treatment is obviously a factor, since a considerable amount of insulin is used in the dressings. Up to date only the ordinary single- and double-strength insulin, as put up for diabetics, has been employed; but I am approaching a firm of manufacturing chemists with a view to obtaining it in ointment form.*

The reasons underlying the effect of insulin on such conditions seem a little obscure. The only explanation I can offer which seems reasonable is that by stimulating the local metabolism of sugar the cell proliferation and local health are increased. It is certain that excess of sugar is inimical to healthy cellular metabolism, as is seen by the lowered resistance to infections in persons suffering from diabetes mellitus. There was no reducing substance in the urine of the patients treated by local applications.

My thanks are due to Mr. E. P. Brockman, F.R.C.S., for permission to publish the first case detailed and Dr. W. Dalgliesh for Nos. 3 and 4.

London, W.1. NEVIL LEYTON, M.R.C.S.

BIBLIOGRAPHY

da Costa, S. F. Gomes. *Tumori*, **6**, 140.
—— and Guedes, F. Bénard (1933). *Acción med.*, **4**, 442.

Treatment of Mooren's Ulcer with Liver Extract

I had the opportunity of observing and treating the following two cases at the Bristol Eye Hospital while house-surgeon there in 1935.

CASE I

A woman aged 60 first attended on March 21, 1934, with Mooren's ulcer of the right cornea, which steadily developed in spite of treatment until the whole cornea was involved. Median canthoplasty was performed on October 24, 1934. At about this time a similar ulcer made its appearance in the left eye. This also developed slowly until by May, 1935, it was half-way across the pupil. I obtained permission to try the patient on injections of liver extract in the belief that the liver would improve the nutrition of the cornea and thus help the ulcer to heal. I prescribed one ampoule of "campolon" (Bayer) once daily for a week, and then one ampoule every other day for three weeks. The Metri cautery (80°–85° F.) was applied to the margins of the ulcer for one minute every second day. A saline wash twice daily was the only other treatment. One month later the patient was discharged, the ulcer being quite healed. She attended every fortnight for an injection of one ampoule of "campolon." The adhesions between the right eyelids were divided two months after her discharge. The cornea was very thin and scarred, but did not stain in any part of it. The ulcers have remained healed ever since, and both eyes were reported "quiet" on June 26, 1937.

CASE II

This patient, a man aged 57, was first seen on January 2, 1935, for Mooren's ulcer of the right eye. This steadily extended until he was put on similar liver treatment on June 6. He was discharged five weeks later with the ulcer healed. He was instructed to get fortnightly injections of one ampoule of "campolon" from his own doctor, but neglected to do so. The ulcer broke down again, and he was readmitted on August 30. After a week's treatment on liver injections the ulcer had healed and the patient was discharged. He was last seen on May 20, 1936, and up to that time the eye had remained quiet.

I am much indebted to Mr. A. E. Iles, senior honorary surgeon to the Bristol Eye Hospital, for letting me have a copy of the notes on these cases and for his permission to submit them for publication.

Cork. CHARLES J. CANTILLON, D.O.M.S., D.O.(Oxon).

* This has since been done, and Messrs. Allen and Hanburys prepare such an ointment. Cases treated with this have been equally successful.

A Method of Treating Fractures of the Lower Leg

It may be worth while to give a short account of this method of dealing with fractures of the lower leg because of its great simplicity and because of certain advantages it has over methods at present in use. The technique can be employed for almost any fracture of the lower leg which requires reduction and application of plaster. The only apparatus needed is a ring fixed on the theatre floor; a heavy weight with a ring attached serves the same purpose.

TECHNIQUE

The patient is anaesthetized and a Kirschner wire is put through the calcaneus two fingerbreadths below and one behind the lateral malleolus. He is then arranged on the operating table with both knees flexed over the end so that the ring on the floor is in line with the injured limb, but six inches in front of the vertical. The Kirschner horseshoe is fixed with extension cord to the ring, a traction indicator intervening. The surgeon now sits opposite the fractured leg and directs an assistant, who pumps up the table slowly. In this way strong traction can be produced which will bring the fragments of the most difficult fracture into alignment. The surgeon, by palpation and comparison with the other leg, which is hanging over the end of the table in the same position, finds that very little manipulation is required to obtain an almost perfect reduction. The leg is in the optimum position for the easy application of a well-fitting plaster. Slight pressure on the inner side of the setting plaster allows for the normal bowing of the tibia.

If the fracture is in the upper third of the tibia the plaster may be extended to the groin when the lower part has set, or a second Kirschner wire may be put through the tubercle of the tibia and incorporated in the plaster, thus leaving a freely movable knee and fixing the upper fragment.

The advantages put forward for this method of treating fractures are: (1) that it requires no elaborate apparatus and is therefore particularly useful in smaller hospitals which do not possess such equipment; (2) that an almost perfect reduction can be obtained, since there is no difficulty caused by the fractured leg sagging in the middle, as is always the case when traction is applied in the horizontal position, this being especially troublesome if the fracture is comminuted; (3) that the leg is in the ideal position for easy and efficient plastering, so that this part of the operation and the reduction can be performed in a relatively short time.

A large number of fractures of the lower leg have been treated this way with very satisfactory immediate and end results.

DOUGLAS LANG STEVENSON, F.R.C.S.Ed.

Reviews

RADIOTHERAPY FOR CANCER

Siebzehn Jaure Strahlentherapie der Krebse. Zürcher Erfahrungen 1919-1935. By Hans R. Schinz and Adolf Zuppinger. (Pp. 340; 95 figures, 215 tables. Rm. 32; G.RM. 34.) Leipzig: Georg Thieme. 1937.

In this very interesting work on sixteen years' experience of radiotherapy in cancer Drs. Schinz and Zuppinger give an account of their work at Zürich from 1919 to 1935, during which period Dr. Schinz has been director of the Roentgen Institute. The canton of Zürich is the main industrial and manufacturing centre of Switzerland, and its capital town of the same name is the most populous in the country. It is therefore of interest to learn that the mortality from cancer in this industrial centre is very similar to that in the rest of the Swiss Confederation, where conditions of occupation are generally very different. Approximately one-seventh of the total deaths recorded in the canton and town of Zürich are caused by cancer, and the figures have increased in recent years. The authors do not regard this increase as being due to multiplication of carcinogenic factors, but merely as a consequence of the increased longevity of the general population, so that more individuals reach the age of maximum liability to cancer. This is, of course, a view which is held by many other eminent authorities both in Europe and America. Although the general cancer mortality has increased, there has for some unexplained reason been a notable decline in the proportion of deaths from cancer of the stomach and uterus. The site incidence of the disease is different in the two sexes. In men, the regions most affected are the stomach, oesophagus, rectum, intestine, pharynx, and lungs; in women, the stomach, breast, uterus, and ovary, which are closely followed by the colon and gall-bladder region. The histological types of growth also show differences in the two sexes. In men, squamous-cell carcinoma is by far the preponderant type; while in women it is much less common, except in cancer of the cervix uteri.

By far the largest part of the book deals with the results obtained in the treatment of cancer in different sites, and a simple and useful formula for indicating briefly the extent both of primary and metastatic growths is proposed. This should be of considerable service in record-keeping, for it shows at a glance the degree both of local extension and of dissemination reached in each particular case when recorded. The subject-matter generally is clearly set out and in many cases conveniently epitomized in tabular form.

There are some points in the history of the Zürich Roentgen Institute which are of interest. It began as a small diagnostic unit under the control of the surgical clinic, and before 1918 it was enlarged by the addition of a radiotherapeutic department, since when its work has been greatly developed and extended, but Dr. Schinz and his colleague observe that this has been terribly uphill work. In spite of the fact that in 1926 the director received the title of professor of medical radiology, his department still remains under the control of the department of surgery. A similar condition of affairs unfortunately still exists in some places in this country, in which a radiotherapeutic department has been developed from small beginnings in a general hospital. If we are to secure and retain the services of the best men and women as radiotherapists they must be accorded the position and security due to their professional attainments and experience. The authors of this book have done a real public service in stating so clearly the conditions under which they have been compelled to work, and we hope that the Zürich Institute of Radiotherapy will soon obtain the independent position to which its excellent work and the high scientific attainments of the director and staff give an unquestionable title.

OPERATIVE OBSTETRICS

Operative Obstetrics: A Guide to the Difficulties and Complications of Obstetric Practice. By J. M. Munro Kerr, LL.D., M.D., F.C.O.G., with the assistance of Donald McIntyre, M.D., F.C.O.G., etc., and D. Fyfe Anderson, M.D. Fourth edition. (Pp. 848; 338 illustrations. 45s.) London: Baillière, Tindall and Cox. 1937.

After an interval of twenty-one years Professor Munro Kerr has brought out the fourth edition of his well-known book, with the assistance of two other members of the Glasgow school—namely, Drs. McIntyre and Fyfe Anderson. In spite of the change of title from "Operative Midwifery" to "Operative Obstetrics" it retains the distinctive individuality that made its predecessors so acceptable. The work rests on a sure foundation—the extensive experience of the author both as teacher and as clinician—and his personality pervades the whole 800 pages.

So much time has elapsed that it is not surprising to find a great deal of the book rewritten; and while Munro Kerr states clearly his own views regarding treatment and results, he enhances the value and interest of each chapter by references to recent publications by authorities in both Europe and America. After introductory pages on the management of labour and the prevention of infection, dystocia due to the various causes is taken up chapter by chapter. Malpresentations, tumours, inertia, contracted pelvis, the haemorrhages, abdominal and vaginal operations—all these are discussed clearly in an attractive manner. As will be expected from the frequency of its incidence, the occipito-posterior case is early considered and fully described, and the original point of view is maintained that such cases may be primary or secondary. In discussing the engagement of the head in vertex cases the author emphasizes the frequency with which the head engages in the transverse diameter of the brim in normal cases. The emphasis on this point is a source of satisfaction to the reviewer, who has for some years held the same view. Contracted pelvis is dealt with in the light of recent research, reference being made to the work of Caldwell, Moloy, and others. The methods employed for induction of labour are fully described and the risks of various methods assessed; and while the author appreciates the value of rupturing the membranes when indications are present he issues a timely warning to his readers against the present tendency in some centres to adopt such intervention almost as a routine procedure.

It is impossible to refer to each chapter separately, but mention should be made of that on Caesarean section—one of the best in the book. As one of the earliest and strongest advocates of the lower segment operation Munro Kerr stresses its advantages over the classical procedure in the hands of the experienced operator. The frequency with which the placenta is found on the anterior wall of the uterus at Caesarean operations; the difficulty of obtaining a sound scar in such cases; the likelihood of subsequent rupture if the placenta develops on this scar—these points are all brought out in the argument against the classical incision as a routine.

In covering the range of difficult midwifery the author has produced a book worthy of study, eminently readable

and well illustrated. Passages here and there both instruct and amuse, particularly when reference is made to individual obstetricians. On page 587 we read: "When an obstetrician informs me that he never employs vaginal hysterotomy I turn away in sadness. To discuss a subject with one so prejudiced is only a waste of time." By undertaking the labour of a fourth edition of his work Munro Kerr has rendered a service to the science and art of obstetrics.

POST-MORTEM TECHNIQUE

The Postmortem Examination. By Sidney Farber, M.D. (Pp. 201; frontispiece and 32 figures. 16s.) Springfield and Baltimore: Charles C. Thomas; London: Baillière, Tindall and Cox. 1937.

This book, devoted entirely to post-mortem technique, may be recommended to all embryo pathologists as an excellent guide to the subject. It will also be of use to the general practitioner who may suddenly be called upon to perform a necropsy. The opening chapter is devoted to a short historical survey, and this is followed by chapters on general considerations and on the equipment of the post-mortem room. The rest of the book consists of a detailed description of the methods to be employed in the examination of each system of the body, and each chapter ends with a short list of selected references. An appendix contains tables giving the average weights of organs, and also an interesting translation of one of Virchow's original elaborate post-mortem reports.

Some of the techniques described, such as the method for the removal of the thoracic viscera, differ from those usually employed in this country. They may, however, be used with safety, as they are, for the most part, similar to the methods originally recommended by Virchow, which it would be found hard to better.

NEUROLOGICAL STUDIES

Études Neurologiques: Les Myoclonies Vélo-Pharyngo-Laryngo-Oculo-Diaphragmatiques. La Maladie de Friedreich. Pathologie du Névraxe. By Georges Guillain and Pierre Mollaret. Septième série. (Pp. 302; 78 figures. 60 fr.) Paris: Masson et Cie. 1936.

In the seventh series of his neurological studies Professor Guillain, with the assistance of Dr. Mollaret, concentrates especially on two subjects—the syndrome of rhythmic myoclonus of the palate, larynx, and ocular and diaphragmatic muscles, and the bulbar symptoms of Friedreich's ataxia. In regard to the former, several new clinical and pathological observations are recorded, and from these and the earlier papers of the French school we can form a fairly complete conception of the syndrome.

While our present knowledge of anatomy and physiology does not afford an adequate explanation for any of the phenomena of involuntary movement, whether rhythmic or choreiform, any new material bearing on this subject is of importance. The fact that each syndrome of this character is most often produced by a lesion in one situation is discounted by observations of similar symptoms appearing when the lesion is in some other centre which at first sight seems to have no close connexion with the tract or nucleus most commonly involved. In the earlier papers on the syndrome under discussion the lesions were almost always found to involve the central tegmental tract in the pons. But in later cases in which the syndrome was present in its most complete form lesions of this tract were absent, and either the inferior olive, the dentate nucleus, or the superior cerebellar peduncle was involved. It thus appears that the syndrome of rhythmic myoclonus may be seen after any lesion of the system represented by the red nucleus, the inferior olive, the dentate nucleus, and their connexions with each other. More than this is not known, nor is it clear why all lesions of this system are not followed by the syndrome.

The studies on Friedreich's ataxia pay special attention to the lesions in the medulla oblongata and to the symptoms resulting from these. In spite of many references to cardiac symptoms, such as tachycardia, in the literature from the time of Friedreich onwards, the dependence of these symptoms on medullary lesions has not been previously emphasized. Guillain and Mollaret point out the frequency of abnormalities in the electrocardiogram in Friedreich's ataxia, and demonstrate lesions in the nuclei of the vagus which may cause them. These observations may explain the paradox that while victims of Friedreich's ataxia do not die of their disease, most of them die young.

Several minor papers on diseases of the brain and spinal cord are also included in this series.

POISONOUS ORGANIC SOLVENTS

Medical Research Council Industrial Health Research Board. Report No. 80. *Toxicity of Industrial Organic Solvents.* Summaries of published work compiled by Ethel Browning under the direction of the Committee on the Toxicity of Industrial Solvents. (Pp. 396. 7s. 6d. net, postage extra.) London: H.M. Stationery Office. 1937.

This is a compilation of existing information prepared by Dr. Ethel Browning. The report deals with no fewer than 100 different compounds, all of which are at present in use in industry. A striking feature of the book is the wide variety of literature from which the information has been collected. A large proportion of the references is to journals devoted to public health and hygiene, but in addition there are numerous references to chemical, biochemical, pharmacological, pathological, and clinical journals. There also are references to specialist medical journals in such subjects as dermatology, haematology, and psychology, and to agricultural and trade journals. The author is to be congratulated on the industry she has shown in collecting information from such a wide variety of sources. The volume therefore represents a useful advance in knowledge, since the mere dispersal of the data collected has rendered them hitherto inaccessible to the ordinary reader.

The committee in an introduction points out that the information available is on the whole very incomplete. It remarks: "For example, the effect of the subcutaneous injection of a large dose of substance may be entirely different from, and have little bearing upon, the effects which may be produced by prolonged inhalation of small quantities." Moreover, "owing to expense and the difficulties of housing large animals, preliminary investigations are nearly always made on small animals. Unfortunately no general rules can be laid down which relate the sensitivity to poisons of small rodents and of man." It is to be hoped that the imperfect nature of the evidence revealed by this survey will stimulate research in this important field of industrial hygiene, which is developing so rapidly.

The character of the volume, which is that of a condensed summary of a very large literature, renders it unsuitable for detailed review. The importance of the subject is obvious, and the value of the report can most easily be realized by calculating in the case of any one of the lists of references how long it would take a research

worker to find these references without the help of this volume. Although the evidence brought together is admittedly incomplete, yet this is obviously a case where any information is better than none, and the volume should prove of great value to all who are interested in industrial hygiene.

THE NATURE OF CRIME

The Criminals We Deserve. A Survey of Some Aspects of Crime in the Modern World. By Henry T. F. Rhodes. (Pp. 257; illustrated. 7s. 6d. net.) London: Methuen. 1937.

Crime is, broadly speaking, an act which breaks the rules of society, but emphasis is usually laid by criminologists on the crime or the criminal, and not on the social code which he infringes. Mr. Rhodes's theme is that society may be wrong too. To say that the responsibility for crime should rest equally on the criminal and on society is not a popular attitude, but more and more thinkers are becoming convinced that it is the only starting-point for a really effective attempt to abolish crime. Mr. Rhodes has an international training, another unpopular thing in this country but one which is likely to teach him more about crime in general than a purely domestic outlook. The commission of a crime, he says, is a blind and unconscious protest against the social conditions which help to determine it. Eventually, he prophesies, we shall become convinced that the only effective way to punish crime is to prevent it. Decent housing conditions would immensely reduce sexual and violent crimes; abundance of remunerative work for those who wanted it would reduce crimes of need. He doubts, however, whether any of these things can be done within a social system which produces for profit and not for use. He has no illusions about the possibility of eliminating crime by a change in the social system, but he thinks that the first step might be taken by constructing a system in which crime could be properly defined. He is much impressed by the Soviet prison system, which places the prisoner in a workshop where he can earn wages and have reasonable recreation and the utmost practicable freedom. In a place of this kind, where the contribution of society is reduced to a minimum, the criminologist will, says Mr. Rhodes, have some opportunity of discovering something about the anti-social man. He is extremely interesting; he writes well and fills his book with practical illustrations and facts. He deals with crime of all kinds, and tells many stories of single crimes to illustrate his opinion that crime, by peaceful penetration, is making itself an organic part of a system which is in decay.

Notes on Books

The ninetieth issue of *Who's Who*, for the year 1938, was published before Christmas, and maintains the standard of workmanship to which the public has long been accustomed. It provides brief biographies of some 40,000 living men and women, arranged alphabetically in 3,746 double-column pages. About a thousand entries have been deleted from last year's edition and replaced by the same number of new biographies, while many thousands of alterations and additions to existing entries have been made. *Who's Who* is an essential reference book in professional and business life, and the staffs of newspaper offices consult it every hour of the day. The publishers are A. and C. Black, Ltd., 4, Soho Square, London, W.1. The price remains at 60s. in buckram or 63s. in strong library binding with leather back; postage of a copy is 9d. inland, 1s. Irish Free State, abroad 1s. 10d.

Volume I of *Charterhouse Rheumatism Clinic Original Papers* was published last year by the Oxford University Press (price 15s.). It contains papers on pathogen selective culture and its bearings on the classification and aetiology of chronic rheumatic disease, by Dr. H. Warren Crowe; on the differential sedimentation test by Dr. Harry Coke; and on spondylitis adolescens with associated pathological changes in the sacro-iliac joints, by Dr. S. Gilbert Scott. Dr. Crowe explains in the preface that contributions here published are printed in the fullest possible detail, "so that there is no excuse for a failure by the technically capable worker to repeat the technique." Assuming sufficient support for this first volume, further research work (both now in being and planned) will be published in due course. The authors will be restricted to members of the staff of the Charterhouse Rheumatism Clinic in Weymouth Street, London, W.1.

Dr. R. M. B. MACKENNA has recently brought out a fourth edition of *Diseases of the Skin*, which was originally written by his father, and has taken the opportunity of bringing it thoroughly up to date. Like most textbooks it has increased considerably in size since its first appearance. It worthily maintains its place as one of the best textbooks of the subject in the English language. The illustrations, always an important feature in works on dermatology, are extremely good, and a special word of praise must be given to the coloured plates; there are no fewer than 46 of these, and most of them reach a high level of excellence. The numerous photographs in monochrome are also quite good. We can thoroughly recommend this book. It is published by Baillière, Tindall and Cox at 20s.

In *A History of Pharmacy* Mr. JAMES GRIER has produced within a small compass a thorough survey of his subject. He traces the evolution of pharmacy and the rise of the pharmacist from the earliest times of magical medicine through the period of the herbals to the scientific developments of the present day. A chapter is devoted to historical sketches of selected drugs, and the book provides all that is necessary for those who must satisfy the examiners in pharmaceutical history, which for examination purposes only begins in 1600. The general reader, however, will find much enjoyment in the earlier pages. It is interesting to read that in ancient Rome the universal remedies were garlic and cabbage (probably sea-kale), and that Virgil speaks of garlic and thyme refreshing the reapers. Also that the elder was one of the sacred trees of our earlier ancestors, and in folk-lore was the especial care of the queen of the elves or fairies. This book is admirably concise, and Mr. Grier is to be congratulated on compressing such a large quantity of information into so small a volume. It is published at 6s. by the Pharmaceutical Press.

Oral Diagnosis and Treatment Planning (W. B. Saunders, 25s.) has been written as a textbook for the dentist and as a work of reference for the medical practitioner. In his preface the author, Mr. KURT H. THOMA, describes it as a master-key to diagnosis for the busy dentist, a reference-book for the physician, and a textbook on the technique of examination, diagnosis, and treatment planning. A complete diagnosis, he says, is frequently talked about but seldom taught in a systematic manner. The philosophy of treatment planning is discussed, but details of technique are left to the various clinical departments, lest, the author says, the work should become too encyclopaedic. The first few chapters deal with treatment planning, which means a review of the patient's general condition in relation to his dental condition; with oral and dental examination, x-ray examination, laboratory tests, biopsy, and the ethics of consultations. The larger part is devoted to diagnosis, and here the author proceeds somewhat on the plan of a well-known botanical handbook, *Name This Plant*. Diseases are grouped, according to their salient features, under

seventeen different headings. Turning to a group showing a salient feature of the case in hand the reader finds a subclassification and may at once find the solution; or he may be referred to another group, finding again a subclassification in which his case lies. The reviewer can only say he has put it to the test and found it to work perfectly. The possible and obvious limitation is that some disease has been omitted—but he cannot point to it. The author mentions many points of clinical interest—for example, high calcification of the teeth in children in hyperparathyroidism, the existence of germs in apical granulomata (Figs. 21 and 22), contraction of the maxillae due to adenoids, and hypoplasia of the roots of the teeth in osteogenesis imperfecta. The book is a valuable contribution to dental literature.

Japanische Literatur zur Tuberkuloseforschung, No. 5 (1936), published by the Society for Tuberculosis Research of the Anatomical Institute of the University of Kyoto, contains abstracts, numbered 484 to 620, mostly in German and the remainder in English, of published Japanese papers on research work in tuberculosis, received as reprints in the library of the Society since 1930. The publishers of this pamphlet are prepared to send to anyone specially interested in any particular article a detailed report of it, free of cost, or to refer a request for the actual paper to the appropriate author.

In his work on *Early Medieval Medicine* (Baltimore: Johns Hopkins Press, 1937, 12s. 6d.), which forms the Hideyo Noguchi Lectures for 1936, Professor LOREN C. MACKINNEY, who holds the chair of mediaeval history in the University of North Carolina but is not a medical man, has given an interesting description of medicine in that portion of the Middle Ages extending from the sixth to the eleventh century. Two distinct types of medicine were then prevalent—namely, the supernatural, which included reliance on Christian saints and their relics and Christian-pagan charms and magical incantations; and human medicine, which is considered under the headings of pharmacy, diet, and surgery in the form of bloodletting and cauterization. In the first lecture Professor MacKinney discusses the changing modern conception of the Middle Ages, and surveys certain general aspects of the medical practice prevalent in Western Europe during this era. In the second chapter, which is devoted to medicine in Merovingian and Carolingian France, the author shows that there was a steady advance in medical practice, while in the third lecture medical progress at Chartres in the tenth and eleventh centuries is discussed. Nearly eighty pages of instructive notes, followed by copies of mediaeval manuscripts, are appended.

Quelques Vérités Premières (Ou Soi-disant Telles) en Chirurgie Abdominale (Paris: Masson et Cie, 24 fr.) is a series of aphorisms relating to the practice of abdominal surgery, written by Dr. H. MONDOR, professor of surgical pathology in the Paris Faculty of Medicine and surgeon to the Bichat Hospital. It may be read with profit by students and general practitioners as well as surgeons. This volume forms one of a series of "first truths" relating to the different branches of medicine, some of which have already appeared, while others are still in the course of preparation. Following an introduction by MM. Ombrédanne and Fiessinger the collection is divided into three chapters, the first dealing with the abdominal wall, stomach, duodenum, and pancreas, the second the intestines and peritoneum, and the third with gynaecology. As an example of the pithy nature of many of the sayings we may quote from this last section (p. 87): "Les hémorragies du fibrome sont des ménorrhagies. Les saignements du cancer sont des métrorrhagies." These aphorisms are well set out in large clear type on dull-surfaced paper, and make easy and stimulating reading. The idea appeals to us, and if the other volumes are as sound and attractive as this one on abdominal surgery the series should meet with well-deserved success.

Preparations and Appliances

INSTRUMENT FOR DETECTION OF OEDEMA

Professor W. C. W. NIXON, M.D., F.R.C.S., writes from the Obstetric and Gynaecological Unit of the University of Hong Kong:

For the detection of oedema pitting by means of finger pressure is a somewhat inaccurate method. I have noticed that by pressing with the bell of a stethoscope a well-marked "ring" impression is made upon an oedematous region, especially if it is one where there is no underlying bone—for instance, the abdominal wall. This instrument which has been devised incorporates not only the stethoscope bell but also a spring by which a known pressure for a known length of time can be exerted. The minimum pressure and the length of time found most suitable has been 2 lb. and five seconds respectively. The "ring" impression so made and the time it takes to disappear decide one as to whether the oedema can be classified as mild, moderate, or pronounced.

This method of testing for oedema has the advantage that it enables one to detect mild grades of oedema, particularly of the abdominal wall, which otherwise would pass unnoticed.

The makers of the instrument are Down Bros. Ltd., 21 and 23, St. Thomas's Street, London, S.E.1.

PREPARATIONS OF CALCIUM SALTS

"Calcipot" is a name for preparations of calcium salts made in Germany by Troponwerke Dinklage and Co. and marketed by Harker, Stagg and Morgan Ltd. (Emmott Street, London, E.1). Tablets of calcipot D (1 gramme) contain 0.28 gramme of calcium citrate and 0.02 gramme of calcium glycerophosphate, together with vitamin B_1 (5 international units), vitamin B_2 (1.5 biological units), and vitamin D (0.9 clinical unit). It is recommended for calcium deficiency, particularly when this is associated with vitamin deficiency. Ampoules of calcipot (5 c.cm.) contain 10 per cent. of calcium gluconate solution, and are supplied for intramuscular or intravenous injection. Injections of calcium gluconate have proved a valuable method for relieving such conditions as tetany when these are due to a sudden fall in blood calcium.

"FERRIPAN"

"Ferripan" (prepared by Troponwerke Dinklage and Co. and marketed by Harker, Stagg and Morgan Ltd.) is a powder which contains fat-free purified liver, iron albumin, and copper albumin. It is recommended for treatment of deficiency or nutritional anaemias. The manufacturers publish clinical charts which show the superiority of ferripan over saccharated iron oxide in the treatment of nutritional anaemias of children.

EPHETONIN COMPOUND

Ephetonin compositum liquidum (E. Merck, Darmstadt) is a solution which contains 2 per cent. each of ephetonin and pyrazinecarboxylic acid-isopropylidene hydrazide. Ephetonin is phenylmethylaminopropanol, and may be described as synthetic ephedrine. It is stated to augment the force of cardiac contraction and to dilate the coronary vessels. The other constituent is stated to have a similar sympatho-mimetic action on the heart, and also to act as a central nervous system stimulant. The combination is recommended for the treatment of cardiovascular insufficiency. It is put up in drop bottles of 10 c.cm. and 20 c.cm. The distributors for this country are Savory and Moore Ltd., 61, Welbeck Street, W.1.

BRITISH MEDICAL JOURNAL

LONDON

SATURDAY JANUARY 8 1938

SERUM TREATMENT OF PNEUMONIA

The study of pneumonia has almost become the prerogative of workers in the United States, their efforts being followed and their results generally confirmed in this country on a much smaller scale and usually after a considerable lapse of time. This time-lag between the positions on opposite sides of the Atlantic now amounts to some five years, because much has happened in the United States since 1932 which has no counterpart here. It will be well to ask ourselves whether emulation of this work in this country would repay the necessary effort.

Recent developments in America may be summarized as follows. In the first place, the efficacy of serum treatment in infections due to pneumococci of Types I and II is established beyond doubt, and in certain States an elaborate organization exists to ensure that serum shall be available, free of charge, for every case of pneumonia requiring it. The results obtainable when the present-day concentrated serum is given really early in the disease are exemplified in a series of 160 Type I cases quoted by Cecil,[1] among which the mortality was only 5 per cent., while Cole[2] refers to a recent series of forty-seven similar cases in which there were no deaths. In this there is nothing radically new except the measures which have made the treatment available. The breaking of actually new ground began with Cooper's identification of new serological types among pneumococci previously described as of Group IV. That there were no fewer than twenty-nine of these newly defined types made it appear at first sight that their identification would be so complex as to be impracticable, but in some American centres it is now a matter of daily routine. Not only has the incidence of these numerous types in pneumonia been fully studied but the characteristic features of the disease produced by some of them have been defined, and in all of the nine new types so far studied from the therapeutic standpoint serum treatment has been found effective. Finland,[3] for example, ascertained the type in 3,682 cases of pneumococcal infections, of which the great majority were cases of pneumonia, and found examples of all the known types, although among those newly defined only V, VII, VIII, X, XIV, and XX occurred in substantial numbers (varying from ninety-three to 279 cases of each type); elsewhere[4] he describes no fewer than 160 cases of pneumonia due to Type VII. Other extensive studies of pneumonia due to these types are those of Finland and Sutliff,[5] who report 125 cases due to Type VIII, and of Rosenblüth and Block,[6] who studied sixty-eight cases due to Type V: this type is said to cause a severe and prolonged attack, quite inconsistent with the common belief that "Group IV" pneumonia is a mild disease. Another recent and comprehensive study is that of Benjamin *et al.*,[7] among whose 485 fully typed cases were considerable numbers of Types V, VII, and VIII; this paper is among those recording the results of serum treatment in some of the new types. A further innovation is the substitution of rabbits for horses as a source of serum. A useful account of this development is given by Horsfall *et al.*,[8] who themselves prepared serum from rabbits and used it in twenty-two cases with only one death. Rabbits form antibodies to the pneumococcus more rapidly than horses and in greater amount, but the alleged superiority of rabbit serum may be due rather to the fact that the globulin molecule in the rabbit is only one-quarter the size of that in the horse (this fact has been proved both by ultra-centrifugation and by ultra-filtration); it may consequently be supposed to pass more readily through vascular endothelium, and has in fact been demonstrated in empyema fluids, whither it is said that horse protein cannot penetrate. Another advantage of serum production in rabbits is that the cost is only one-fifth of that involved in using horses. Whether this method will be generally adopted, as it certainly should if there is nothing to set against these remarkable advantages, it is still too early to say.

These are the facts from America. How do they affect us? The answer must largely depend on whether our pneumonia problem is similar to theirs. According to Horsfall[9] there are 100,000 deaths annually from pneumonia in the U.S.A., of which it may be calculated from the known results of serum treatment that 35,500 are preventable. Pneumonia certainly has a lower mortality in this country than in the U.S.A.; whether it is also much less frequent—another belief which would furnish some excuse for our comparative inactivity—is doubtful. What really matters is how

[1] *J. Amer. med. Ass.*, 1937, **108**, 689.
[2] *Milit. Surg.*, 1937, **81**, 241.
[3] *Ann. intern. Med.*, 1937, **10**, 1531.
[4] *Amer. J. med. Sci.*, 1937, **193**, 59.
[5] *Arch. intern. Med.*, 1934, **53**, 481.
[6] Ibid., 1937, **60**, 567.
[7] *Ann. intern. Med.*, 1937, **11**, 437.
[8] *J. Amer. med. Ass.*, 1937, **108**, 1483.
[9] *Canad. publ. Hlth. J.*, 1937, **28**, 476.

much of our pneumonia is amenable to serum treatment, and that we certainly cannot say; nor shall we be able to do so until typing is done far more frequently and extended to the individual types in Group IV. It must also be extended to cases of bronchopneumonia, since one fact which emerges quite clearly from American studies is that virulent pneumococcal infections amenable to serum treatment occur also in this variety of the disease. Such a study, if undertaken finally on such a scale as to apprise us fully of the pneumonia position in this country, could not be undertaken by any individual or in any single institution, or even by any self-constituted group of investigators; it demands the support and control of a public authority. What is involved if a serious effort is made to render serum treatment for pneumonia generally available may be gathered from a report by Cecil *et al.*,[10] which reviews progress in this direction in the United States and makes recommendations for its extension. Such facilities exist at present only in the States of New York, Massachusetts, Connecticut, and Michigan, and they have been financed both by the State Government and by insurance companies and large charitable endowments. This service includes not only the provision of serum free of charge from numerous distributing stations but facilities for typing and an educational campaign directed to ensuring early diagnosis and immediate treatment.

It is emphatically stated at the conclusion of this report that the results already obtained justify the appropriation of State funds for this purpose. We have a long way to go in this country before such a position could be reached, since none of our serum, with the exception of that used by the London County Council, is yet produced by a public authority, though serum is distributed free to practitioners. Such an assumption of responsibility by public health authorities may or may not be desirable or necessary, but it is evident that, if anything needs to be done about pneumonia in this country, the problems both of investigation and of effective provision for treatment are quite beyond the capacity of individual effort.

[10] *J. Amer. med. Ass.*, 1937, **109**, 1323.

EVALUATION OF DISABILITY

The growth of industry and of social insurance has given great importance to the question of the proper compensation of those who, by reason of accident or illness, are unable to earn a living, and whose diminished earning capacity needs to be supplemented by payments out of the various funds provided for this purpose. The International Labour Office has received many requests for advice on how such disability ought to be assessed for the purpose of granting workmen's compensation, sickness benefit, and invalidity pensions. In November, 1936, the Office convened a meeting of experts in these matters, and commissioned them to prepare a report, in which the existing methods of assessment of disability should be reviewed and recommendations made as to how these methods might be improved. The committee entrusted with this work included representatives of Governments, insurance organizations, employers, and workmen, and its report has now been published under the title of "The Evaluation of Permanent Incapacity for Work in Social Insurance."[1] This provides an admirable survey of the practice of all the principal countries of the world in dealing with disabled persons.

Incapacity is considered in three aspects: loss of anatomical or physiological integrity; loss of ability to continue at work in the individual's own trade or in allied occupations; and general incapacity, including a consideration of such factors as the age, experience, and opportunities of the worker to obtain suitable employment. In many countries there is a schedule of injuries and other disabilities, to each of which is assigned a figure. This figure may be a percentage of average earning capacity, or a period of time estimated as representing the probable duration of incapacity for work resulting from such conditions, and it is used to fix the amount of money payable to the disabled worker. Such schedules are binding in some countries, while in others they are used only as a guide to the competent authority; it is suggested that the latter arrangement is preferable, and that when a schedule is used it should be reasonably comprehensive, should take account of the age and occupation of the worker, as well as of the nature of his handicap, and should be subject to revision from time to time, so as to conform to advances in knowledge and experience. In discussing the question of commutation of periodical payments by way of "lump sums," it is pointed out how this may prove unfair to the injured person if his condition should turn out to be disabling for a longer period than was expected at the time of settlement. It is not enough to rely on average periods of disability, for "there does not seem any justification for depriving an injured person whose incapacity proves to be lasting of all right to compensation on the grounds that other injured persons who have suffered a similar injury have been able to recover their earning capacity."

The problems involved in assessment of disability are exceedingly complicated, and include a con-

[1] International Labour Office. Studies and Reports Series M (Social Insurance), No. 14. London: P. S. King and Son Ltd. (10s. 6d.)

sideration of medical, industrial, economic, and legal factors. Such problems cannot properly be dealt with except by an authority which is so constituted as to be able to give due weight to all these factors. In practice the authorities may be classified under three heads: (1) civil courts, (2) accident or invalidity insurance institutions, (3) special courts or boards set up for the purpose. There is much to recommend the last-named of these, provided that the tribunal is representative of all the interests which should be concerned. Experts may be attached to such an authority, either in an advisory or a judicial capacity. The report discusses the safeguards which should be provided to ensure that the assessment shall be made with proper impartiality, full knowledge of the facts, and reasonable dispatch and economy, and the point is made that there should be arrangements for appeals and for a review of the case if necessary. This report is a well documented and most helpful contribution to a subject which is likely to be of increasing importance with the expansion of industrial medicine.

INDUSTRIAL POISONING

The steadily increasing importance of organic chemistry is one of the outstanding features of modern industrial development, and new compounds are continuously being introduced for use both in factories and in our homes. The extent of this development is revealed by the report issued by the Medical Research Council on *Toxicity of Industrial Organic Solvents*,[1] which describes no fewer than one hundred of such compounds. This figure is a tribute to the enterprise of industrial chemistry, but at the same time is somewhat alarming from the point of view of industrial hygiene. The great majority of these compounds are volatile, and hence those using them are likely to be exposed to their fumes, even though this risk is greatly reduced in modern plants. On the other hand, our knowledge of the toxic actions of drugs on man is very limited; indeed few would care to prophesy whether a new compound is harmless even as regards the production of acute poisoning, and this lack of knowledge is even more pronounced as regards the risk of chronic forms of intoxication, because the estimation of minor toxic disturbances due to prolonged exposure to low concentrations of vapour is such tedious and difficult work that it is unlikely to be undertaken except in institutes specially equipped for the purpose. For such reasons knowledge of the pharmacological actions of new chemicals has been apt to lag far behind their industrial application. There is a tendency, therefore, for the toxicity of new solvents to be determined by the simple method of large-scale trial upon human populations. The dangers of such a situation are obvious, and we must consider it a fortunate chance that hitherto we have had relatively few unpleasant surprises regarding the toxic potentialities of new compounds. The report of the Medical Research Council represents a step forward, since it collects in one volume such knowledge as is at present available. Study of the volume brings to light the remarkable variety of substances used as industrial solvents, and it shows too that the information concerning their actions on animals and man is scattered throughout an extremely wide range of literature. The mere collection of this widely dispersed material is an important first step in the advance of knowledge of the properties of these important compounds, whose use is now extending so rapidly. Examination of the evidence collected shows, however, that in most cases it is very incomplete, a fact emphasized in the introduction to the report. There is thus an urgent need for the organization of systematic research on this subject, so that pharmacological knowledge may be kept more nearly abreast of the advances made by organic chemists; otherwise it seems inevitable that sooner or later some really dangerous substance will find its way into industry and do much harm before its potentialities for evil are recognized.

[1] See page 73 of this week's issue.

PROGRESS IN ASTHMA RESEARCH

The Asthma Research Council makes grants to qualified investigators who work in asthma clinics and in laboratories attached to hospitals. The money is derived almost entirely from donations, but a small part of the revenue comes from the sale at 1s. a copy of the useful booklet *Physical Exercises for Asthma*. Last year the Council published a second and revised edition of this pamphlet, which, with the annual report for 1937, may be obtained from the Secretary, c/o King's College, Strand, London, W.C.2. The report, which is sent to inquirers free of charge, gives ample evidence of valuable work, but also stresses the need for a constant supply of money. Owing to lack of funds the Council could not give further grants to the clinic at Leeds General Infirmary or to the St. John Clinic, Pimlico, or continue to pay for research in "wide-field" *x*-ray therapy. It will have to reduce its expenditure still further in the new year unless the work receives the support it deserves. Interesting results have been obtained at the Guy's Hospital clinic and will be published shortly. Of thirty-five cases treated by protein inhalation for rhinorrhoea fourteen showed either cure or considerable improvement, five some improvement, and sixteen none. Considering how intractable these cases are the figures are encouraging. Attention is being turned from groups to individual cases; patients are admitted for biochemical investigation, and an allergen-free room has just been made available. Dr. Gerson has been treating some particularly obstinate cases by diet, and Dr. Strauss has investigated the psychogenic factor.[1] Dr. Bruce Pearson has completed a paper on his investigations into skin sensitivity, which showed that a surprising number of apparently normal people give positive skin reactions to common inhalants.

[1] See *British Medical Journal*, December 25, 1937, p. 1284.

Dr. F. A. Knott has conducted routine tests to determine the relative importance of hypersensitivity and bronchiolar infection in each case; and observations on rising sedimentation rate as an index of relapse, and on the effect of vaccines. At St. Mary's Hospital attendances are limited by providing the patient's general practitioner with material for treatment at home. The staff try to afford as much relief as possible to every patient who comes for treatment, holding that this method is not only philanthropic but also scientific, as it is the best means of obtaining the clinical material necessary for intensive investigation. Most of the research work has been done on hay fever, as it is convenient and deductions can be applied to other diseases of the asthma-urticaria group as well. All asthma patients tend to adopt a wrong way of breathing and benefit from remedial exercises. These are taught and their results investigated at King's College Hospital. In 70 per cent. of cases there is cure or considerable improvement, and only about 15 per cent. of those who acquire perfect breathing technique do not benefit at all. At St. Bartholomew's Hospital Dr. D'Silva has been working for a number of years on the mobilization of potassium in the blood after the injection of adrenaline. Blood sedimentation has been studied at the General Hospital, Birmingham. It would be a great pity if all this useful work were allowed to collapse for lack of funds.

WORLD REQUIREMENTS OF NARCOTIC DRUGS

The League of Nations has recently issued the estimates of world requirements of narcotic drugs for 1938 as formulated by the Supervisory Body under the Limitation Convention of 1931. These estimates have been furnished by 63 countries and 104 colonies or oversea territories. Where such information has not been vouchsafed in the case of some ten countries and as many colonies the Supervisory Body has itself framed the estimates. There is thus provided a conspectus for the whole world of the amounts of the several scheduled narcotics required for legitimate use. For morphine the total figure is 45,658 kilos, but of this only 10,126 kilos are for consumption of the alkaloid as such, the remainder being employed for conversion—for example, into codeine, heroin, or dionin. Of codeine the total is 29,921 kilos, of heroin 1,133 kilos, and of cocaine 5,032 kilos. In the case of morphine the requirement is rather more, and in the case of codeine considerably more, than it was in 1934, whereas the amount of cocaine required for legitimate consumption is less than for that year. Turning to the tables indicating the estimates furnished by the several Governments it is interesting to note that while the morphine requirement (including that for conversion) for Great Britain is 2,114 kilos, that for France is 4,650, for Germany 5,850, for Soviet Russia 8,000, for the United States 8,653, and for Japan 4,593. The requirements for heroin in kilogrammes are: Great Britain 56, Germany 3, Soviet Russia 350, United States 0, and Japan 180. The highest estimates for heroin for use as such were received from Soviet Russia, Italy, and Japan. The consumption of cocaine appears to be greatest in Japan, the United States, and Soviet Russia. The countries which failed to furnish the required estimates and for which the Supervisory Body itself had to frame them were Mexico, Cuba, Panama, Ecuador, Paraguay, Peru, Bolivia, Ethiopia, Liberia, and the Union of South Africa.

A NEW FOOD AND DRUGS BILL

Publication of the third interim report of the Local Government and Public Health Consolidation Committee marks a further step in the consolidation of the public health law. The report (Cmd. 5628, price 1s.) is accompanied by a draft Bill (Cmd. 5629, 1s. 6d.), and deals with the law relating to food and drugs. It also extends to markets and slaughterhouses. The committee was set up in 1930 by Mr. Arthur Greenwood, then Minister of Health, under the chairmanship of the late Viscount Chelmsford, who was succeeded by Lord Addington, the present chairman. Its original terms of reference were:

> With a view to the consolidation of the enactments applying to England and Wales (exclusive of London) and dealing with (*a*) local authorities and local government and (*b*) matters relating to the public health, to consider under what heads these enactments should be grouped in consolidating legislation and what amendments of the existing law are desirable for facilitating consolidation and securing simplicity, uniformity, and conciseness.

The existing law relating to food is directed towards two distinct objects—the safeguarding of public health and the protection of purchasers from fraud and deception—and, while in the main the public health code deals with the first of these objects and the sale of food and drugs code with the second, the legislature has not been entirely consistent and there are many provisions of a public health character in the latter code. The committee felt that, as a matter of practical convenience, the two codes should be combined in a single measure, and for this purpose its terms of reference were enlarged. For reasons indicated in the report the draft Bill, unlike the two earlier local government and public health Bills prepared by the committee, extends to London. For this purpose also the committee's terms of reference were enlarged and its membership increased so as to secure representation of the London authorities. The draft Bill, in addition to securing this unification of the two existing codes, represents a great simplification of the existing law. Its 102 clauses take the place of some 240 sections of existing Acts, some of which, dealing with the adulteration of tea and coffee and with knackers' yards, date from the eighteenth century, and others, such as the Bread Acts, from the early nineteenth. Of the more modern Acts reproduced in the draft Bill mention may be made of the Milk and Dairies (Consolidation) Act, 1915, the Milk and Dairies (Amendment) Act, 1922, the Artificial Cream Act, 1929, the Public Health (Cleansing of Shell-fish) Act, 1932, and the Milk Act, 1934. The changes which the Bill would effect are dealt with in detail in the report and an appendix. Among the more important may be

mentioned the alteration in the definition of "Food and Drugs Authorities"—that is, the authorities to be entrusted with the administration of the provisions of the Bill dealing with the adulteration of food and drugs. The course recommended by the committee and given effect to in the draft Bill is to abandon the present definition, which is based on factors some of which are plainly out of date, and to include in the definition county councils and county borough councils (as at present) and councils of non-county boroughs and urban districts having a population of not less than 40,000 with a discretionary power for the Minister of Health to confer the functions on the council of any other borough or urban district with a population of more than 20,000. The committee has not considered its task to be the framing of ideal legislation, but has attempted to reproduce the existing law with such amendment only as in its opinion would be likely to command general assent.

SUICIDE IN AMERICA

Suicide is becoming recognized in the United States and also in Canada as a serious sociological problem. One of the most recent surveys comes from Boston, where Dr. Merrill Moore has published[1] an account of the 1,147 patients who were admitted to the Boston City Hospital between the beginning of 1915 and the beginning of 1936 after attempting suicide. He finds that attempted suicide cases are coming to the hospital in greater numbers: 99 cases in the last year of the period against 24 in the first. The sex incidence was fairly equal: 616 women and 531 men. Seventy-two men and 55 women succeeded; perhaps, Dr. Moore thinks, men generally use mechanical and more physically aggressive methods, such as shooting, slashing, and leaping, whereas women usually take poison. The most popular methods in order of choice were poison by mouth, inhalation of gas, cutting throat or wrists, leaping, shooting, hanging, and drowning. The great majority were discharged "relieved." Only 67 patients were obviously ill enough in mind to be sent to a mental hospital. The age distribution definitely related suicide to the curve of sexual activity: the largest age group in women was 20-25, in men 26-30. The motives, among the 266 patients who stated them, were chiefly economic factors in the men and domestic difficulties in the women, ill-health coming third in both. About 10 per cent. drank alcohol shortly before or at the time of the attempt. No fewer than 322 patients drank iodine, but none died; the next most popular poisons were mercury compounds, barbiturates, "sylphonathol," and mercurochrome. So far as could be ascertained few patients repeated the attempt. Married women made the largest status group with 260, then unmarried women 176, married men 163, and unmarried men 148. Unemployment appeared possibly to be a precipitating factor: 50 per cent. of the women were not lucratively employed. Among the employed an important predisposing factor seemed to be maladjustment to their work. Few attempts were made in the winter; the favourite month for men was April and for women August, the favourite day for men Sunday and for women Wednesday. Most of the patients were white and came from the lower classes. Dr. Moore suggests that more individual attention should be paid to failed suicidal cases, especially from the point of view of psychology and of social medicine. He proposes the establishment of protective wards in large general hospitals where patients may be treated and studied. From Toronto Dr. Ruth Franks,[2] who has studied 352 consecutive cases of attempted suicide admitted to the Toronto City Psychiatric Hospital from November 1, 1928, to October 31, 1935, suggests that suicide may be prevented by raising the standard of education and the mental and physical health of the populace, by teaching certain lay and professional groups to recognize the danger signals of probable suicide; by abolishing the stigma, minimising publicity, fencing off heights, and paying greater attention to suicide in medical, social, and legal instruction. She also considers that improvement may result from training young persons to take responsibility and from encouraging the cohesion of social groups. She lays stress on the value of a fixed regular routine day in bringing satisfaction and contentment to unsettled persons, and also advocates clinics to which those who are distressed may come for help. She finds a higher incidence in foreign-born than in native persons, and considers that this difference should be investigated. Rather surprisingly, she does not suggest any means for improving the economic position of would-be suicides, perhaps because the problems which this cause involves are too large and difficult for the scope of her thesis.

[1] *New Engl. J. Med.*, 1937, **217**, 291.

[2] *Canad. med. Ass. J.*, 1937, **37**, 139.

THE HONOURS LIST

A classified record of the medical New Year's Honours, taken from the *Supplement* to the *London Gazette* of December 31, will be found at page 88. The outstanding item in the eyes of members of the British Medical Association is the knighthood conferred upon our President, Professor Robert James Johnstone. The success of the Annual Meeting at Belfast last year was largely due to his genial personality and the commanding position he holds in the medical profession and the public life of Northern Ireland. The Right Hon. Earle Page, Minister of Commerce and Deputy Prime Minister of Australia, whom we welcomed in this country not many months ago, receives the high honour of G.C.M.G., and Lord Horder that of G.C.V.O. Major-General Ernest A. Walker, I.M.S., lately Director of Medical Services in India, Army Headquarters, becomes K.C.I.E.; and Miss Florence Barrie Lambert, well known for her work on the London County Council, is created D.B.E. The honour of knighthood is conferred also on Dr. Joseph William Leech, M.P. for the Newcastle-on-Tyne West Division and a former Lord Mayor of Newcastle; on Dr. William George Savage, who has now retired from the post of county medical officer of health for Somerset after twenty-eight years' service, during which he published valuable reports on

the bacteriology of water supplies, milk, and food infections; on Dr. Charles McMoran Wilson, a London physician whose fine work as Dean of St. Mary's Hospital Medical School must be known to all readers of this *Journal*; and on Dr. Charles Norman Paul, dermatologist to the Sydney Hospital. Lord Nuffield's princely benefactions to medicine and other good causes are rewarded by a viscountcy, and Mr. E. W. Meyerstein's large gifts to hospitals and medical schools by a knighthood.

EVERYDAY PROBLEMS OF INCOME TAX

The statutes concerning income tax have become notorious for their complexity, as indeed the report of the recent Codification Committee frankly admits, and the authors of a recent handbook[1] set themselves no mean task when they proposed "to deal with everyday problems in ordinary everyday language." They have succeeded to a very commendable degree, and in so doing have supplied a want which is often felt, and which has sometimes been expressed in letters to the editor of this *Journal*. The binding, print, and general arrangement are particularly good for a book published at a low price, and the contents can fairly be claimed to cover the "everyday problems," and a good many more that are less frequent but nevertheless common enough to justify inclusion in a general statement of the law and practice of income tax. The professional man will find such questions as beginning and ceasing practices, and successions clearly dealt with; and there is a chapter on the allowances for depreciation, renewal, and obsolescence of machinery, which is very well written. A pleasing feature of the book is the frequent use of clear and simple examples, without which, indeed, verbal explanation of such matters is always difficult to follow. There are one or two points which the authors might usefully reconsider for a second edition. Thus their remark that allowable advertising expenditure includes "the reasonable entertainment of customers" is perhaps literally true, but would be incorrect if "customers" were read as including professional clients. The chapter on salaried employments, etc., would have been improved by the addition of a note on the concessional practice of including the emoluments of a medical office as part of general practice receipts. As the chapter stands it implies that all such salaries must be separately assessed under Schedule E, whereas the reverse is not only the common but also the much more convenient course. The "Notes on Accounts" in Appendix A include an example of the account of a medical partnership which should be helpful, and there is a useful note on the cash basis account, or, as the authors call it, an account "on a receipts and payments basis," in which they express the opinion that "there is a growing reluctance on the part of the Revenue authorities to agree to accounts drawn up on this basis, when presented for the first time." In our experience such reluctance can usually be overcome, assuming that accounts have been supplied for, say, the first three years on the earnings basis. We disagree definitely with the authors on one point arising out of the "cash basis." They regard with favour the practice of adding the amount of the outstanding book debts to the profit shown by a cash basis account for the final year of a practice. We regard such an addition as incorrect, and unfair to the practitioner. It should be assumed that the profits of the first three or four years of the practice have been assessed on the earnings basis, and the fact that the profits so calculated exceeded the cash profits of those years provides a sound reason for adhering to the amount of the cash basis profits when the practice is treated as having ceased. This, however, is a minor blemish on one of the most successful attempts we have yet seen to state income-tax practice simply, clearly, and in a readily accessible form.

[1] *Income Tax Explained.* By K. Adlard Coles, M.A., F.C.A., and John Macdonald, M.A. London: Jordan and Sons Ltd. 5s.

CALCIUM DEFICIENCY

The article in our present issue (p.59) by Dr. Katharine Coward and her co-workers provides interesting information about the effect on young rats of a "normal" poorer-class diet consisting largely of bread, margarine, jam, and potatoes, with some meat and a little milk and green vegetables. One series of experiments was devised to check the conclusions of Simpson and Wood,[1] who found, with children of the poorer class, that addition of virol to the diet produced more benefit than did addition of either cod-liver oil or of halibut-liver oil plus dried milk. The experiments on rats gave the opposite result, since the liver oils produced beneficial effects, while the virol was almost without influence. These two series of conflicting results are so unlike in character that it is difficult to estimate their relative importance. It is, of course, obvious that experiments on rats provide only indirect evidence regarding the dietary requirements of children. On the other hand, it must be remembered that a standard of accuracy is possible in animal experiments that is completely unattainable in feeding experiments with children. A second series of experiments made with young rats fed on the "normal" poorer-class diet described above, with the addition of cod-liver oil, showed that the percentage of ash in their bones was slightly less than four-fifths that of the normal. The addition of cod-liver oil should have ensured the absorption of the calcium and phosphorus present in the diet; moreover, the deficiency in bone ash was prevented by the addition to the diet of either a salt mixture containing calcium and phosphorus or milk. The authors conclude: "This proves quite clearly that the ordinary mixed diet of the poorer classes is seriously deficient in the elements required for the calcification of bone." The importance of this conclusion is so obvious that it requires little comment. It is in general accordance with the findings of American authorities such as Sherman, who have contended for many years that calcium deficiency is one of the most serious dangers of improperly balanced diets.

[1] Simpson, T. W., and Wood, E. C. (1935). *Med. Off.*, **53**, 125, 135.

SURGICAL PROCEDURES IN GENERAL PRACTICE

This is one of a series of articles contributed by invitation

ABRASIONS AND CONTUSIONS

BY

R. J. McNEILL LOVE, M.S., F.R.C.S.

An abrasion as such is of little moment, but it may be of supreme importance in that solution of continuity of skin or mucous membrane is apt to allow the entry of organisms into the tissues. Theoretically even the smallest abrasion should be treated with promptitude, and treatment maintained until the wound is soundly healed. In practice, however, small abrasions are often considered to be such trivial injuries that they are apt to be neglected, or at the most receive a "dab of iodine." Members of the medical profession who are exposed to the risk of virulent infections, especially pathologists and surgeons, are sometimes sufficiently careful to protect an abrasion from infection, but even among our own profession tragedies occur from time to time. The organisms which may gain entry through an abrasion fall into two groups—namely, non-specific, or pyogenic, and specific.

Non-specific Infections

Various strains of staphylococci and streptococci commonly affect the tissues in the region of a neglected abrasion. Staphylococcal infections are usually localized, and if suppuration occurs the pus is thick and creamy. Streptococci, on the other hand, are apt to cause a rapidly spreading inflammation, and any pus which may form is scanty in quantity and seropurulent in nature. It is of importance, especially in connexion with treatment, to remember that organisms which have gained entry through an abrasion may spread by any of the following routes: (1) by continuity, which mode of spread is most in evidence when virulent organisms, especially streptococci, infect loose connective tissue, such as the subaponeurotic space under the scalp, or subcutaneous tissues; (2) by lymphatic channels, when red streaks may be seen denoting acute lymphangitis, going on to enlargement and tenderness of the regional lymphatic glands, which may subsequently suppurate; (3) by the blood stream, some degree of toxaemia being expected if the infection is of moderate severity, while if the invading organisms are virulent or the resistance of the patient is low, septicaemia may follow, or even pyaemia with associated metastatic abscesses.

Specific Infections

Probably the specific organism most to be dreaded is the *B. tetani*. Abrasions contaminated by cultivated soil are particularly dangerous, but those associated with street accidents are less prone to be infected with tetanus than formerly, owing to the diminishing numbers of horses now employed. Nevertheless, any patient who has sustained an abrasion of sufficient depth or so contaminated as to be potentially infected must be given an intramuscular injection of 1,000 international units of antitetanus serum. Some calcium preparation should be given orally for a few days, so as to prevent or minimize serum reaction—this applies to the administration of any serum. Among the other specific organisms which may gain entry through an abrasion is the *Spirochaeta pallida*. Prophylactic treatment, such as washing with potassium permanganate solution, 1 in 1,000, and the subsequent application of 30 per cent. calomel ointment, practically guarantees freedom from infection.

Hydrophobia is due to infection of an abrasion, usually at the time of infliction, but occasionally inoculation follows the licking of an abraded area by an infected animal. If infection is suspected the wound should be treated immediately by the actual cautery, or by a strong caustic such as pure carbolic acid, which is less painful owing to its local anaesthetic properties. If reasonable grounds exist for presuming that the offending animal was suffering from rabies, then the patient is sent without delay to an institute where he can receive Pasteur treatment. As the incubation period in man is rarely less than two months, ample time is available for the journey to a recognized centre.

The anatomical tubercle (verruca necrogenica) is a further example of the danger of inoculation of an abrasion. This condition occasionally occurs in butchers and others who are exposed to inoculation by tubercle bacilli. A warty excrescence presents itself, usually on the back of the hand. The most expeditious treatment is by excision.

Treatment of Abrasions

An abrasion should be treated by suitable dressings until it has completely healed and all risk of infection has disappeared. This applies particularly to patients who are exposed to irritants, such as chemical workers, and to medical practitioners, nurses, or undertakers, whose occupation subjects them to the risk of inoculation by organisms. During the first few hours, when the abrasion is still clinically uninfected, the application of a mild antiseptic is all that is required locally. Tincture of iodine (*B.P.*, 2½ per cent.) is commonly applied as a first-aid expedient, but such a strong antiseptic is liable to do more harm than good, as it devitalizes the tissues and renders them less resistant to infection. This is especially so in those cases in which a few hours' delay has allowed organisms to enter the wound. Therefore, except possibly as an immediate application to a small abrasion, tincture of iodine is not to be recommended. More suitable applications are surgical spirit, aqueous solution of flavine (1 in 1,000), or eusol, which must be fresh and applied cold. The antiseptic property of eusol depends mainly upon the presence of chlorine, which is readily driven off if the solution is heated. Other suitable antiseptics are lysol, and its allied preparations, in 1/2 per cent. solution, or dettol. Friar's balsam (tinct. benzoini co.) is a popular and efficient application. Any of these antiseptics, except eusol, is applied once or twice daily. A eusol dressing should be changed three times daily, as its antiseptic properties rapidly deteriorate. If the abrasion is contaminated with soil, gravel, or dirt an anaesthetic is sometimes desirable, so that the wound can be thoroughly cleansed and ragged skin removed, or the edges excised. A general anaesthetic is usually required for children, and in the case of adults evipan or an allied preparation is very satisfactory.

If infection develops treatment is directed to localizing the inflammation, as a spreading cellulitis may cause a long and anxious illness and even terminate fatally. The first essential is rest to the affected part. A sling should

be applied if the upper limb is involved, and in the case of the trunk or lower limbs confinement to bed for a few days is desirable, except in the mildest cases. A detailed description of the treatment of cellulitis is beyond the scope of this article, but the frequent application of hot hypertonic saline solution (1/2 oz. of salt to 1 pint of water) by means of either immersion or hot compresses is an excellent method of treatment. Abrasion of the knees in children ("gravel rash") is not uncommonly followed by some degree of cellulitis, which is apt to result in a sympathetic effusion into the knee-joint. Doubt may exist as to whether the effusion is serous or purulent, but in the former case a few degrees of painless movement is possible, whereas suppurative arthritis causes intense spasm, and severe pain is experienced at any attempt to move the joint. If a diagnosis cannot be made in any other way a needle should be inserted through healthy skin and a small quantity of fluid withdrawn for examination. In the case of inflammation following an abrasion giving rise to adenitis of the regional lymphatic glands the timely application of antiphlogistine or kaolin tends to avert suppuration. The general health must also receive consideration, sedatives, aperients, stimulants, or tonics being ordered as necessary. If the infection is streptococcal in nature, then sulphanilamide should be prescribed.

Abrasions of Special Organs

Abrasions of the alimentary canal are worthy of mention; scratches or abrasions due to a fish-bone or other sharp object are common events in general practice. The patient usually insists that the sharp object is still *in situ*. If he locates the site of injury to the mouth or pharynx a careful inspection must be made, in order to confirm its presence or else to disprove his statement and reassure him. Special attention is paid to the tonsillar fossae, as a small fish-bone embedded in the tonsil is readily overlooked. If the patient says that a small foreign body is "sticking in the gullet" he should be reassured and directed to feed on pultaceous food, and it may be justifiable to prescribe some harmless medicine or a mild bromide mixture as a placebo for a nervous patient. If the symptoms persist for more than twenty-four hours an oesophagoscopy should be performed, as the patient may be correct! I have seen death result from ulceration of a fish-bone through the wall of the oesophagus into the arch of the aorta, and cases of mediastinitis are occasionally reported. The old-fashioned probang should not be used unless it is impossible to obtain the services of a surgeon familiar with oesophagoscopy. A cotton-wool sandwich may be of assistance occasionally. A thin layer of cotton-wool is sandwiched between two pieces of well-buttered bread, and the patient is asked to eat this. Some of the cotton-wool does tend to collect round the fish-bone or other foreign body, and may diminish the possibility of its injuring or penetrating the gut. Occasionally abrasions of the other end of the alimentary canal are also fraught with danger. An enema syringe with a rigid nozzle should never be used unless a rubber catheter is attached, otherwise it may abrade or even perforate the wall of the anal canal or rectum. Such abrasions have been followed by cellulitis of the wall of the bowel, which in some cases has spread to the pelvic cellular tissue with fatal results.

Abrasions of the cornea always require careful attention so as to avoid the development of a scar, which, if situated centrally, will impair vision, and in any case will persist as an ugly reminder. Two or three drops of castor oil and a pad and bandage for twenty-four hours is usually adequate treatment. Lead lotion should never be applied to skin abrasions in the region of the orbit unless it is quite certain that no corneal abrasion exists, otherwise lead albuminate forms over the abraded area and remains as a permanent corneal opacity.

Contusions

The term "contusion" implies laceration of and haemorrhage into subcutaneous tissues or deeper structures, following an external injury but unassociated with any wound of the skin. The clinical features of a subcutaneous contusion are pain, which occurs immediately, ecchymosis, which follows shortly, and swelling, the extent of which depends upon the severity of the injury and the laxness of the damaged tissues. Pain varies with the extent and site of the injury. Contusion of tissues which can accommodate a considerable extravasation of blood, such as the scrotum, is comparatively painless, whereas a contusion of the auricle is usually somewhat painful. Ecchymosis, or bruising, is due to infiltration of the tissues with blood, and if extensive the overlying skin may be almost black in colour. This is especially noticeable when the injury affects lax tissues in which oozing readily occurs, as, for example, when injury to the circumorbital region results in a "black eye." In some cases the blood extravasates along the fascial planes and appears at a distance from the site of injury; thus, a blow on the skull is apt to damage subaponeurotic vessels, and bruising may appear some days later in the eyelids or in the region of the mastoid process.

In the case of severe contusions a haematoma may form and present itself as a fluctuant or boggy swelling. As a rule serum collects in the centre while fibrin is deposited in the periphery, and eventually the haematoma is absorbed. At this stage a subpericranial haematoma closely simulates a simple depressed fracture of the vault, as on palpation the edge of the clot resembles the rim of bone surrounding a depressed area of the skull. However, the clot can sometimes be indented by the finger-nail, and in the absence of intracranial complications delay of a few hours is of little moment, so a radiograph can be taken in order to distinguish the two conditions. Occasionally a haematoma persists as a permanent swelling, which consists of a sac containing serous fluid and surrounded by laminated fibrin, which later is organized into fibrous tissue. Haematoidin crystals, derived from blood pigment, are commonly found in the wall of this so-called "blood cyst." If the history of injury is forgotten by the patient a blood cyst is a fruitful source of errors in diagnosis.

A common complication of contusions, associated with either extravasation of blood or a haematoma, is infection. The organisms gain entry either through a coexisting abrasion, or are blood-borne from some focus of infection such as the tonsils or teeth, or from distant cutaneous lesions. The advent of suppuration is indicated by increased swelling, heat, and constitutional disturbances. The swelling associated with a contusion is due primarily to oozing from small blood vessels. The blood which escapes subsequently clots and excites an aseptic inflammatory reaction. If the nutrition of the underlying skin is impaired thereby blebs or blisters are apt to develop, a condition which not infrequently complicates the treatment of fractures of the tibia.

Treatment of Contusions

The treatment of a contusion is directed first of all towards limiting the amount of oozing from ruptured

capillaries and small vessels, and so controlling the extravasation of blood and preventing the formation of haematomata. The first essential is again rest to the affected part, either by the limitation of activities, splinting, or confinement to bed. The application of cold in the form of an ice-bag or suitable lotions, such as lead lotions or surgical spirit, is valuable. The traditional raw beefsteak for contusions of the orbit is an example of a cold application. In some cases pressure by means of a bandage, perhaps soaked in cold water, will limit extravasation, but care must be taken not to interfere with the circulation of the affected part.

The majority of haematomata require no surgical intervention, but a timely incision is occasionally needed to relieve tension and evacuate blood clot when a contusion results in the extravasation of the blood or the formation of a haematoma in a confined space. A classical instance is contusion of the muscles of the forearm, which are enclosed in an inelastic fascial compartment. Extravasated blood causes an abnormal tension in this confined space and consequent impairment of venous circulation. Neglect or delay in incising the deep fascia of the arm may cause lifelong disability in the form of Volkmann's ischaemic contracture. In some situations an ugly mass of organized blood clot is apt to persist if the haematoma is treated conservatively—the "cauliflower ear" which follows an untreated contusion of the auricle is a good example. This can be prevented by a small incision, evacuation of the serum and recent clot, and the application of a firm elastoplast dressing.

Contusions of deeper structures, such as the brain or lung, are beyond the scope of this article, but a few words may be added in connexion with the abdominal organs. A contusion of the liver is suspected rather than actually diagnosed. The site of injury, possible association with a fracture of the lower ribs on the right side, a moderate degree of shock, and local tenderness all suggest the nature of the injury. A constant pulse reading indicates that progressive haemorrhage is not occurring, and two or three days later suspicions of a contused liver are sometimes confirmed by the appearance in the urine of bile, which has escaped from ruptured biliary capillaries and which is subsequently absorbed by the blood stream. Very occasionally a circum-umbilical patch of jaundice appears, due to the extravasation of bile into the cellular tissue overlying the bare area, and absorption of bile pigment by the lymphatics which accompany the ligamentum teres. The treatment of a suspected contusion of the liver is expectant; omnopon is given (morphine is unnecessary in the absence of severe pain, and is apt to cause vomiting and alimentary derangement) and an ice-bag applied over the site of injury. A careful watch is kept on the pulse, so that continued haemorrhage may be readily recognized, and more energetic treatment instituted if necessary.

Contusion of the kidney is diagnosed by haematuria following trauma in the kidney region, and occasionally an indefinite swelling is palpable in the loin, due to extravasation of blood and urine. Every specimen of urine should be saved and compared with previous ones, so that some idea can be gained as to whether the bleeding is subsiding or persisting. Omnopon is given and an ice-bag or cold pack applied to the renal region. Urinary antiseptics are said to prevent the development of a perinephric abscess, which is a common complication of a contused kidney. If haematuria is persistent, or if the pulse rate rises, operative intervention should be considered, in order either to repair or remove the kidney.

CONGRESSES ON RHEUMATISM AND HYDROLOGY

The Oxford Meeting

The International Congress on Rheumatism and Hydrology, which is to be held in Oxford, with preliminary entertainment in London, from March 25 to 31, is being convened jointly by the International Society of Medical Hydrology and the International League against Rheumatism.

The president-elect is Sir Farquhar Buzzard, Regius Professor of Medicine at Oxford; the chairman of the British Organizing Committee is Sir Humphry Rolleston, and the office of the congress is c/o the International Society of Medical Hydrology, 109, Kingsway, W.C.2.

There will be two main subjects for discussion. "Wet and Dry Climates and Weather in the Causation of Disease" will be introduced by Professor G. Danischewsky (U.S.S.R.), Dr. G. Edström (Sweden), Professor de Rudder (Germany), and Dr. E. P. Poulton (Great Britain). The second subject, "Juvenile Rheumatism," will be considered under four aspects, the principal speakers being: *Pathological aspect:* Professor F. Klinge (Germany) and Dr. A. G. Gibson (Great Britain). *Clinical aspect:* Professor L. Findlay (Great Britain) and Dr. H. Grenet (France). *Therapeutic aspect:* Dr. Wilfrid Sheldon (Great Britain) and another opener. *Social aspect:* Dr. F. J. Poynton (Great Britain) and Professor G. Danischewsky (U.S.S.R.). There will be numerous supplementary papers to the discussion on juvenile rheumatism, and it is hoped that supplementary papers will also be received for the first subject.

Visits are to be paid to hospitals in London on March 26, and there will be receptions on the evenings of the 25th and 26th. Arrangements are being completed for the accommodation of congress members in colleges at Oxford; a concert, banquet, and reception have been arranged there; visits will be made to Leamington Spa during the meeting and to Droitwich at the end.

The congress is open to medical men and scientists who are not members of either body on payment of a congress fee. All inquiries should be addressed to the General Secretary, International Congress on Rheumatism and Hydrology, 109, Kingsway, London, W.C.2.

The Bath Meeting

The Bath Congress on Chronic Rheumatism is to be held to commemorate the bicentenary of the Bath Royal National Hospital for Rheumatic Diseases on March 31, April 1, 2, and 3. It will follow directly after the International Congress at Oxford. The meeting will be opened by Lord Horder on the evening of Thursday, March 31, and his address will be followed by a mayoral reception and dance. The next day will be devoted to a discussion on "Gout and Rheumatism of Metabolic Origin," and papers will be read by Sir Walter Langdon-Brown, Professor Weil, and Drs. Hill, Gibson and Kersley, Weissenbach, and Francon, the discussion being resumed by Drs. Geronne, van Breeman, Kahlmeter, and Freund. There will be a banquet in the evening. On Saturday, April 2, papers will be read by Professor Pemberton, Professor Hench, and Professor Davidson. The following morning a demonstration of cases will be given at the hospital.

The meeting will be open to all practitioners, and further particulars may be obtained from the honorary secretary, c/o the Bath Royal National Hospital for Rheumatic Diseases.

The Middlesex County Council on December 21 adopted proposals for a large increase of hospital accommodation in the county, and for the provision of seaside convalescent homes near Southampton and at Mundesley, Norfolk. The sum of £658,000 will be spent on extending the West Middlesex County Hospital, Isleworth, and £650,000 on extending the Hillingdon County Hospital, Uxbridge.

Nova et Vetera

EDINBURGH ROYAL INFIRMARY

DR. LOGAN TURNER'S HISTORY

Few persons are better qualified to write the history of the Edinburgh Royal Infirmary[1] than Dr. Logan Turner. He was educated there, was house-surgeon to Mr. Annandale, served his term of office as surgeon to the ear, throat, and nose department, and is widely read in the history of medicine. He has had access to the minute-books of the Infirmary, and the volume may be looked upon as both accurate and readable. The first few chapters are devoted to the foundation of the medical school at Edinburgh. Dr. Logan Turner traces the persistence of the Hippocratic tradition, showing how it was kept alive in Europe and how in due course it came to Edinburgh. Clinical teaching was always one of its features. Boerhaave made it fundamental at Leyden, and from Leyden it was brought to Edinburgh in the middle of the eighteenth century. Teaching in the presence of the patient was a novelty. It quickly attracted students from England, Ireland, the American colonies, and the dependencies, and the Edinburgh school of medicine thus became famous throughout the English-speaking world.

"The Little House"

From the foundation of the medical faculty in Edinburgh University Dr. Logan Turner passes to the history of the Royal Infirmary. It began humbly in 1729 as a voluntary effort to relieve the sick poor coming from any part of Scotland—"The Little House," with only six to eight beds, under a mistress at a salary of £4 sterling and one servant. Thirty-five patients were admitted the first year, with nineteen cured and one death, at a cost of £97 19s. 7½d. The money was obtained in part by an "Infirmary Sunday," when the General Assembly of the Church earnestly recommended that all the parish churches throughout Scotland should set aside a Lord's Day on which a collection should be taken up. "The Little House" was to be staffed only by Fellows of the Royal College of Physicians of Edinburgh on a fortnightly rota of service, a system which was soon proved to be unworkable. Within a short time it was found necessary to have surgeons; two were chosen, each to act for a month at a time, operate, and supply medicines gratis. Students availed themselves of the teaching at the hospital, and arrived in such numbers as to be embarrassing both to the staff and to the patients. The remedy was to enforce a payment of two guineas for the privilege of "walking the hospital," the money being allocated to the general funds of the Infirmary.

The advantages of a hospital were recognized, a Charter was granted, and arrangements were made for a building to accommodate 228 patients. This was found to be on too grand a scale, and when it was opened in 1741 the "family" to be transferred from the old quarters consisted only of thirty-four patients. During "the '45" until after the battle of Culloden the Infirmary was practically a military hospital, and the sum of 4½d. to 7½d. a day was paid for each soldier. In 1918 the cost per soldier had risen to 4s. 9d. a head, with an allowance of sixpence a day for each unoccupied bed placed at the disposal of the military authorities.

Teaching and Staffing

The history explains how there arose the system of teaching partly by a professorial staff and partly by the ordinary staff of the hospital, which *longo intervallo* has now been adopted by the "units" in many of the English voluntary hospitals. It tells, too, of the rise and growth of the nursing staff, and gives a very excellent portrait of Nurse Janet Porter, of whom W. E. Henley wrote:

> "The doctors love her, tease her, use her skill:
> They say 'The Chief' himself is half afraid of her."

She was perhaps the last of the system which placed a staff of nine women in charge of seventy-two patients, distributed in six wards and six little rooms, whose wages in 1792 were raised from £3 10s. to £5 per annum. They worked magnificently, but in later days shared, quite undeservedly, the opprobrium which was justly due to the "watchers." Women who were not resident in the Infirmary came in at night and were paid from fourpence to sixpence for each attendance. The battle of women to secure medical teaching is described at length, due credit being given to Miss Jex-Blake and Mrs. Garrett Anderson. They were helped amongst others by Patrick Heron Watson, who taught them surgery from eleven to midday every Sunday until complaint was made, when he moved the time of his class forward to nine o'clock so as not to interfere with the hour of Divine service.

The history is continued until the present time, and shows how the different special departments have developed, adding greatly to the usefulness and advancement of medical science. Finally there are appendices recording various data which it would be difficult to obtain otherwise. There is a good index, and the illustrations are remarkably well reproduced. On the whole this is a most useful and very cheap book, for it only costs ten shillings.

D'A. P.

[1] *Story of a Great Hospital. The Royal Infirmary of Edinburgh, 1729–1929.* By A. Logan Turner, M.D., LL.D., Hon. F.R.C.P.Ed. (Pp. 406; 34 illustrations, 4 plans. 10s. net.) Edinburgh: Oliver and Boyd, Tweeddale Court. London: 33, Paternoster Row. 1937.

ANNALS OF MEDICAL HISTORY

The frontispiece of the September number of the *Annals of Medical History*[1] reproduces the comfortable result of laughter and what often precedes it as shown by the figure of Sir Theodore Turquet de Mayerne, the first Fellow of the Royal College of Physicians of London to be chemically minded. Dr. P. Gibson of Kingston, Ontario, sketches the life of this fine clinician and court physician of the seventeenth century, and publishes some of his letters. Dr. J. T. Howard of Baltimore writes on the Doctors Gustavus Brown and, by his reference to the three traditional explanations of Gustavus as a family name, supplements Dr. Eugene Cordell's account in 1902 of "The Doctors Gustavus Brown of Lower Maryland." Vesalius's description of the vermiform appendix under the name of the "blind intestine" is reproduced by Dr. Samuel W. Lambert of New York, and thus explains the authoritative statement that Vesalius did not mention the vermiform appendix, though it appears in Calcar's illustrations in the *De Fabrica*. In his article on Nathan Smith and early American medical education Dr. L. D. van Antwerp quotes the pleasant simile of W. H. Welch: "Nathan Smith's essay on typhus fever is like a fresh breeze from the sea amid the dreary and stifling writings of most of his contemporaries." The life of Jean Dominique, Baron Larrey, Napoleon's fearless surgeon, is sketched by Dr. P. E. Bechet, who provides illustrations of his "flying" ambulance and his handwriting. Two articles continued from previous instalments—on "The Doctor on the Stage" and the "Medical History of Vienna"—are concluded in this number.

[1] *Annals of Medical History.* New Series, Vol. 9, No. 5, September, 1937. Edited by Francis R. Packard, M.D. (Pp. 401–516; illustrated. £2 10s. for volume of six numbers. New York: Paul B. Hoeber Inc., Medical Book Department, Harper and Brothers. London: Baillière, Tindall and Cox.

CROYDON TYPHOID INQUIRY

MEDICAL OFFICER OF HEALTH'S FURTHER EVIDENCE

Dr. O. M. Holden, medical officer of health for Croydon, had been in the witness chair for three days when the report in the last issue (p. 30) was concluded, and his examination continued for two further days.

In answer to Mr. A. H. Forbes, appearing for the Croydon Division of the B.M.A. and the Local Medical and Panel Committee, Dr. Holden said that his Public Health Committee at an early stage decided to give no information regarding the area of the water supply affected. The policy of the committee was to refrain from such publicity as would alarm the public, though there was no specific instruction to maintain secrecy with regard to water or any other subject. There were no medical men or women on the committee. The tackling of the outbreak was his job as medical officer of health, and as soon as he saw the outbreak was not declining he appealed to the best authority he knew—namely, the Ministry of Health. He did not think it would have helped him at all to have called together the local members of the profession. In reply to a question from his own counsel (Mr. Sandilands) Dr. Holden said that not all the medical men in Croydon were members of the British Medical Association; there was in fact no organization representing all of them. Mr. Forbes said that the membership of the Croydon Division was 250, but this included members outside the borough. Dr. Holden agreed with his counsel that he would have been very unpopular if he had notified the local medical men that he was holding a kindergarten class in typhoid for members of the profession who did not feel themselves competent to deal with such cases.

Water-borne Typhoid

The chairman of the tribunal (Mr. H. L. Murphy, K.C.) asked Dr. Holden whether on an outbreak of typhoid, as distinct from isolated cases, investigation did not ultimately lead back to water. Dr. Holden replied that this was not so in every instance, though he agreed that in his own experience of outbreaks in this country since the war water had been the direct cause of most of them. In the early stage of the recent outbreak he could not consider water alone as apart from a number of factors. Mr. Murphy said that perhaps an earlier answer given by Dr. Holden had not quite done him justice; he had said that he could not suspect water until other factors had been eliminated.

At a later stage Dr. Holden mentioned a number of outbreaks due to articles of food where there was apparently no direct communication with the public water supply, notably at Coventry in 1933 and Penzance and Camberwell in 1923.

In reply to Sir Humphry Rolleston, Dr. Holden agreed that the medical officer of health was a specialist in preventive medicine and public health, and should always be glad to receive information and to advise his colleagues in the medical profession who were not so completely immersed as he in the subject which he professed. He regarded the Ministry not as his master but as his superior adviser in cases of need.

Engineering Evidence

Mr. C. E. Boast, Croydon borough engineer, next gave evidence. He said that in April, 1936, chlorination was carried out once or twice a week at the Addington well, and heavier dosages were given in January and May, 1937, owing to certain occurrences, in the first instance the death of a workman at the well and in the second discoloration with clay caused by the construction of another well. The workmen were good and reliable. He had excluded any with signs of tuberculosis, but he had not in his mind the question of a typhoid carrier. He found it very difficult to believe even now that the outbreak was due to one of these men who was a carrier, though he agreed that the dates of his employment fitted in with that theory of causation.

Mr. H. F. B. Jones, formerly chief water engineer at Croydon, gave confirmatory evidence as to the selection of the men and their trustworthy character. He added that during the work on the well samples of the water were taken each evening before it was turned into the public supply, and if these were not satisfactory the water was pumped to waste all night.

Evidence was also given by Mr. F. S. Ellis, foreman in the water engineering department of the corporation, as to the sanitary precautions at the well. When Mr. R. J. Jackson, chief sanitary inspector, gave evidence that last year 4,000 boy scouts were on a camping ground in the vicinity the chairman said that it would require very strong persuasion to induce him or his assessors—who had visited the locality—to hold that the typhoid organism came from that camp into the Addington well.

Several workmen (who, because of the suggestion that one of their number was a carrier, were sworn in private and referred to by numbers) gave evidence as to the rules about sanitation, and said that to their knowledge these had never been broken.

Evidence of Consulting Bacteriologist

On January 4 Dr. Ernest Victor Suckling, consulting analyst and bacteriologist, was examined. In reply to Sir Walter Monckton he said that he had made a special study of matters relating to water supply, had had a wide experience of chemical and bacteriological examinations of all classes of water, and was well acquainted with waterworks practice. On November 10 he was consulted by the Croydon Corporation; he came to Croydon on the following day, and from that time onwards he had been in daily communication with the officials. All the recommendations he had made had been followed as quickly as circumstances would permit.

Is the supply at this moment, in your opinion, safe and wholesome water?—I am confidently of that opinion. It has been since the date I came here.

You have taken a great number of samples of the water, and I suppose in your investigation on the gathering ground you have acquired a mass of information upon which you have founded your opinion. Have you been able to trace at all the *B. typhosus*?—No, in no case have we succeeded in isolating it.

Is that a frequent difficulty when you are trying to deal with the causes of an outbreak?—That is commonly the case. It is extraordinarily difficult to isolate *B. typhosus* from water, sewage, and the like, but the fact that one gets negative findings does not entitle one to say it was not there.

The trouble is, I understand, that the bacillus is short-lived, and also that it occurs in association with more robust forms of bacteria which result in shortening even that short period. In other words, you start to search for a short-lived bacillus at much too late a period to be likely to find it.—Unless, of course, the source is continuing. Where there is an intermittent admission of typhoid bacilli one is weeks late in starting.

Can it be said that the infection in this case was probably water-borne?—Yes.

You have heard described possible sources of pollution to be found in the gathering ground. Can one exclude the possibility of the infection being brought from the gathering ground into the well?—I do not think that can be definitely excluded, but I regard it as improbable.

What do you say about the short length of latrine trench as a potential source?—I should regard that as the most probable source of typhoid, and that for two reasons: first, its proximity, and, secondly, the fact that it is concerned with human excreta, whereas the other potential sources are largely animal. *B. typhosus* is to be found in human excreta, but not in animal.

In reply to Sir Humphry Rolleston, Dr. Suckling said that certain Salmonellas might be found in swine, both

healthy and diseased, but he was not aware that *B. typhosus* had ever been found in swine. His understanding was that for practical purposes man was the only animal which could carry typhoid bacilli for any period.

The Question of Carriers

Sir Walter Monckton next took the witness to the question of carriers.

If a carrier had been working in the well, what would you say to that as the cause of the outbreak?—In my opinion that is the most probable cause of this outbreak, but I cannot consider it at all as conclusive. It is a question of probabilities, as is usually the case in typhoid outbreaks. In my opinion the most probable cause in this case is the existence of a carrier.

Are carriers usually regarded as of two kinds, those in whom the infection is conveyed by the faeces and those in whom it is conveyed by the urine?—Yes.

Is a person necessarily a carrier continuously?—He may be intermittently a carrier.

By Sir Humphry Rolleston:

Is there any way from a bacteriological point of view of distinguishing between the faecal and the urinary carrier? Does the one more constantly than the other give a positive result?—Generally speaking, the faecal type are less intermittent than the urinary.

When you mentioned two types of carriers, I suppose you regarded a third form—namely, a person with a suppurating abscess in connexion with bone disease—as too rare to merit attention?—That is a possibility, I appreciate that.

When would you think that an established carrier can be acquitted of having an evil result—after three or a larger number of negative examinations for the bacillus?—I should say a larger number than three, but I should hesitate to give a number.

What would you say as to the time interval between examinations—consecutive days or consecutive weeks?—I would suggest that if five or six examinations were carried out at intervals of five or six days and were uniformly negative, that is about as much as one should reasonably be expected to do, though I should not regard the result as conclusive in view of the medical history. In the case of a urinary carrier I should want more tests and over a longer period.

In further reply to Sir Walter Monckton, the witness said that the Addington well could undoubtedly be made a safe source of supply. Chlorination was one of the most important processes from the point of view of bacteriological purification. By adding coagulant a much wider purification was obtained. Sir Humphry Rolleston asked whether there was evidence that the coagulant had any specific action on typhoid organisms. The witness replied that there was no such evidence, but that he imagined that the accumulation of saprophytes on a filter would tend to shorten the life of typhoid bacilli.

Potential Causes of Pollution

Mr. Sylvester Gates, appearing for the South Croydon Typhoid Committee, said that it had been established that the workman who was a carrier was not a urinary case, and he asked Dr. Suckling how he would consider that the infection of the well could be attributed to this man. Dr. Suckling replied that he did not accept the conclusion that because a certain number of examinations had been made and had proved negative, this carrier might not have excreted typhoid bacilli in the urine. There was evidence in literature that certainly more than half of the carriers of the faecal type intermittently excreted typhoid bacilli in that way.

Mr. Gates said that the presence of *B. coli* in large numbers in the well could not be due to a carrier, and suggested massive pollution of some kind, probably from sewage. Dr. Suckling replied that the use of the word "massive" was hardly correct. The *B. coli* test was an extremely delicate one, and if the organisms were found in 1 to 10 c.cm. of water it might indicate that the amount of sewage pollution in that water was of the order of one part in millions. Mr. Gates further argued that inasmuch as after an attack of typhoid the victim was immunized for the rest of his life, if afterwards he took in typhoid bacilli through the mouth he might become a carrier; therefore, if the carrier in this case had previously suffered from typhoid and had drunk any of the water in this well while working there, it would account for him becoming a carrier, though he would have had nothing to do with the causation of the outbreak. Dr. Suckling replied that in his view the man was a chronic carrier, and had been so for many years, though he admitted there was no proof of this.

Dr. Suckling was also questioned as to the possible reason why only one case had occurred at the mental hospital, which was supplied directly from the source. He said that he thought this might be explained by the fact that while the water was supplied to consumers generally at night, after the men had left off working, it was supplied to the mental hospital mainly during the day, the storage tank there probably being full before the night supply was forthcoming. Further, the hospital had a softening plant, which, although it did not ordinarily effect purification, might, by reason of the fine suspended matter clogging the interstices, act to some extent as a filter.

Sampling of the Water

Asked how often samples should be taken, Dr. Suckling said that no definite statement could be made as to frequency of sampling; it depended on many factors. Regularity was not the main consideration. The sampling should be arranged so as to give analytical and bacteriological information as to the supply, and therefore it was important to take samples at certain times rather than at others. He was questioned about the general character of the analyses (which were not his own) of the Croydon water previous to the outbreak, and passages from his own textbook were quoted to him by counsel with the object of showing that in various respects—as, for example, the absence of any attempt to define the type of coliform bacillus found—they fell below standard, and it was also suggested that the samples were taken by an unskilled person and the reports were not interpreted by an experienced bacteriologist. Dr. Suckling agreed that greater attention had been paid to the chemical analysis, whereas from the health point of view the bacteriological side was the more important. He was not prepared, however, to mention the count for coli which he would allow without anxiety; one could not take one factor in isolation from others, and one never considered a sample water on one item alone.

Mr. Gates drew his attention to the last analysis made on October 29, before the outbreak, when it was reported: "Colonies per c.cm., 230; *B. coli communis* present in 10 c.cm." to which the remark was attached, "This is a good water, but I think chlorination should be used as a precaution." Could a worse water be imagined? It was this water which was at that very time poisoning the inhabitants of Croydon. Dr. Suckling replied that he could not agree with the description of it as a good water. If he had received that sample he would have reported that it was polluted water and must not be put into supply until chlorinated.

Forthcoming Witnesses

Sir Walter Monckton said that the case for Croydon Corporation would be completed after he had called the town clerk and had recalled the medical officer of health.

Mr. Montague Lyons, for the South Croydon Typhoid Committee, said that he proposed to bring forward as a witness a typhoid patient, who could not be out of hospital for ten days. It might be necessary for the cross-examination to take place in hospital in the presence of the members of the tribunal. The evidence would be an extension and confirmation of what had already been discussed.

Mr. Sandilands, for the medical officer of health, said that he had had other offers of witnesses in support of the medical officer from all over England, but he proposed only to call one very senior medical officer of health to give evidence as to a medical officer's responsibility.

The Chairman: Is not that statutory?

Mr. Sandilands: I do not think it is altogether.

The Chairman asked Mr. Lyons whether he was in a position to bring forward any positive evidence about contamination by *B. typhosus* from any particular source.

Mr. Lyons: In this case, no, Sir. I can only give you theories and inferences.

The Chairman: There is no reason why you should do more. Your case may well be that there were a number of possible sources. That is sufficient for you. I only wanted to know before I made some observations that I was not prejudging any positive evidence you might later bring forward.

Number of Cases and Deaths

Sir Walter Monckton announced at the sitting of the tribunal on January 4 that the number of cases was 290 and the deaths 35. The names of ten patients dangerously ill with typhoid at Mayday Hospital were posted outside the town hall.

NEW YEAR HONOURS, 1938

In the list of New Year Honours, issued as a special supplement to the *London Gazette*, the names of the following members of the medical profession are included:

G.C.M.G.

The Right Hon. EARLE CHRISTMAS GRAFTON PAGE, P.C., M.B., Ch.M. Minister of Commerce and Deputy Prime Minister of Australia since 1934.

G.C.V.O.

THOMAS JEEVES, Baron HORDER OF ASHFORD, K.C.V.O., M.D., F.R.C.P. Physician-in-Ordinary to the King; Consulting Physician to St. Bartholomew's Hospital.

K.C.I.E.

ERNEST ALEXANDER WALKER, C.B., M.B., Ch.B., F.R.C.S.Ed., Major-General, I.M.S. Lately Director of Medical Services in India, Army Headquarters.

D.B.E. (Civil)

FLORENCE BARRACLOUGH BARRIE LAMBERT, C.B.E., M.B., B.S., D.P.H., J.P. For political and public services in London.

Knighthood

ROBERT JAMES JOHNSTONE, M.B., B.Ch., F.R.C.S., F.C.O.G. Emeritus Professor of Gynaecology in Queen's University, Belfast; Representative of Queen's University, Belfast, on the General Medical Council; Member of the Northern Ireland Parliament; President of the British Medical Association. For services to public health in Northern Ireland.

JOSEPH WILLIAM LEECH, M.D., D.Ch., M.S., F.R.C.S.Ed., J.P., M.P. Member of Parliament for Newcastle-upon-Tyne West Division since 1931; Lord Mayor of Newcastle-upon-Tyne, 1932–3; Sheriff, 1930–1. For political and public services.

WILLIAM GEORGE SAVAGE, M.D., D.P.H. Late County Medical Officer of Health for Somerset; Past President of the Society of Medical Officers of Health.

CHARLES MCMORAN WILSON, *M.C.*, M.D., F.R.C.P., Dean of St. Mary's Hospital Medical School; Honorary Secretary, Faculty of Medicine, University of London.

CHARLES NORMAN PAUL, M.B., Ch.M. Honorary Dermatologist to Sydney Hospital. For public and philanthropic services in the Commonwealth of Australia.

C.B. (Military)

WILLIAM PORTER MACARTHUR, D.S.O., O.B.E., M.D., D.Sc., F.R.C.P.Lond., F.R.C.P.I., D.P.H., D.T.M. and H. Major-General, A.M.S. Honorary Physician to the King; Commandant and Director of Studies, Royal Army Medical College, Millbank, London, S.W.

C.M.G.

THEODORE GRANT GRAY, M.B., Ch.B., M.P.C. Director-General, Mental Hospitals Department, Dominion of New Zealand.

JOHN NEWMAN MORRIS, M.B., B.S., F.R.A.C.S. For public and social welfare services in the State of Victoria.

PHILIP HENRY MANSON-BAHR, D.S.O., M.D., F.R.C.P., D.T.M. and H. Consulting Physician to the Colonial Office and Crown Agents for the Colonies since 1929; Lecturer and Deputy Director-General, Clinical Division, London School of Hygiene and Tropical Medicine.

ALBERT RUTHERFORD PATERSON, M.B., Ch.B., D.P.H., D.T.M. and H., Colonial Medical Service. Director of Medical Services, Kenya Colony.

C.I.E.

PERCY STRICKLAND MILLS, M.B., B.S., D.T.M. and H. Colonel, I.M.S. Surgeon-General with the Government of Bengal.

FREDERIC ALLAN BARKER, O.B.E., M.D. Lieut.-Colonel, I.M.S. Inspector-General of Prisons, Punjab.

REGINALD VICTOR MARTIN, M.R.C.S., L.R.C.P., D.O.M.S. Lieut.-Colonel, I.M.S. Officiating Inspector-General of Prisons, Bombay Presidency.

GERALD TYLER BURKE, M.D., F.R.C.P. Lieut.-Colonel, I.M.S. (retired). Lately Secretary, Medical Council of India; lately Professor of Medicine in the University of Lucknow.

C.B.E. (Military)

BRYAN PICKERING PICK, O.B.E., M.R.C.S., L.R.C.P. Surgeon Rear-Admiral, R.N. Honorary Surgeon to the King.

O.B.E. (Civil)

JANET VERA GOOD, M.R.C.S., L.R.C.P. Senior Woman Medical Officer, General Post Office.

EDWARD POHAU ELLISON, M.B., Ch.B. Chief Medical Officer and Deputy Resident Commissioner, Cook Islands, Dominion of New Zealand.

JOHN CHARLES FULTON, M.B., B.S. Medical Superintendent, Launceston Public Hospital, State of Tasmania.

The Rev. PETER MCGREGOR SHEPHERD, M.B., Ch.B. Representative of the United Free Church of Scotland Mission in the Bechuanaland Protectorate.

HUGH MORLEY OLIFF LESTER, M.R.C.S., L.R.C.P., D.T.M. and H. Colonial Medical Service. Deputy Director, Sleeping Sickness Service, Nigeria.

M.B.E. (Civil)

SELINA FITZHERBERT FOX, M.D., B.S. Founder and Director of the Bermondsey Medical Misson.

AINSLIE CLIFFORD WILLIAM DESSA, Indian Medical Department. *X*-Ray Department, Irwin Hospital, Delhi.

WILLIAM STANISLAUS MARTIN, Indian Medical Department. Civil Surgeon, Coonoor, Madras.

RAI BAHADUR PITAMBER PANT. Civil Surgeon, Etawah, United Provinces.

JOHN MAXWELL HALL, M.R.C.S., L.R.C.P. Colonial Medical Service. Senior Sanitary Medical Officer, Jamaica.

PAULINE VERSFELD MURRAY, M.B., Ch.B. For medical services in the Nyasaland Protectorate.

Kaisar-i-Hind Medal (First Class)

SARAH ANDERSON JAMIESON RANKINE, M.B., Ch.B. Medical Officer, St. Margaret's Hospital for Women and Children, Poona City, Bombay. For public services in India.

Mrs. MARY HILDA YOULE REMFRY, M.B., B.S. Wife of Mr. Justice C. O. Remfry, Bengal. For public services in India.

JOHN MICHAEL PEREIRA, M.B.E. Major, Indian Medical Department (retired). Superintendent, Patna Medical College Hospital, Bihar. For public services in India.

HARI VISHWANATH TILAK, M.B., B.S., F.R.C.S.Ed. Medical practitioner, Bombay. For public services in India.

Local News

SCOTLAND

Payment of Hospital Staffs

At a meeting of the Royal Hospital for Sick Children, Glasgow, on December 22, 1937, Sir George A. Mitchell, deputy chairman of the board, made a statement concerning the decision of the directors to pay the members of the medical staff of the hospital. He said that the practice of paying medical and surgical staffs had been started by the rate-aided hospitals, and a demand had now been made that voluntary hospitals should follow suit. The directors of the Royal Hospital for Sick Children were satisfied that the time had come when they must ask the public to support them in recognizing financially in a reasonable manner the great services rendered to them by members of the medical profession on the staff. Times had changed, and many members of the profession, particularly the younger men, found it difficult to make ends meet, and if the medical, and very specially the surgical, services of skilled men were not adequately remunerated they would soon cease to be available. The directors were satisfied that their decision to remunerate the physicians, surgeons, and specialists would commend itself as reasonable and fair to the general public. The cost would be considerable, but they felt assured that the people of Glasgow and the West of Scotland would support them in this movement and readily provide the requisite funds. The Earl of Home, who presided at the meeting, gave some figures of the work of the hospital. In 1883, the first year of the old hospital, there were 260 patients; during 1937, 7,000 children had received treatment in the hospital and 1,076 in its country branch. Out-patients had numbered 92,000, and the daily average number of children resident in the hospital had been 254 and 79 in the country branch.

Institutional Maternity Services in Edinburgh

At a meeting in November last of the Edinburgh Obstetrical Society the president, Dr. Douglas Miller, took for the subject of his valedictory address the history of the Edinburgh Royal Maternity and Simpson Memorial Hospital. Dr. Miller said that in a Minute of the Edinburgh Royal Infirmary of October, 1755, Dr. Thomas Young, who might be regarded as the founder of the obstetrical school in Edinburgh, was given permission to furnish a ward of six beds at his own expense and to use it for the care of lying-in women and for the clinical instruction of students and midwives. This was probably the earliest record of the institutional care of lying-in women in Scotland. In 1791 the Edinburgh Lying-in Hospital, which could accommodate about twenty patients, was founded, largely through the personal exertions and private financial support of Dr. Alexander Hamilton, who succeeded Dr. Young in the chair of obstetrics in 1780. This remained the Edinburgh Maternity Hospital until 1839, when, on the death of Dr. James Hamilton, who had succeeded his father in 1900, the hospital premises were sold. During the next forty years the hospital occupied various sites, and it was not until 1879 that, helped by a generous donation from the National Fund established to perpetuate the memory of Sir James Young Simpson, the present hospital was built and dedicated to the memory of the great physician whose name it bears. The present century had seen a remarkable expansion in all aspects of the hospital's work and the development of many fresh activities. Dr. Miller mentioned particularly the endowment in 1901 of a bed to be reserved for the treatment of diseases of pregnancy, one of the earliest provisions, he said, for ante-natal treatment to be made in any maternity hospital. The ante-natal department of the hospital was created by J. W. Ballantyne, whose insistent and eloquent advocacy of the claims of expectant motherhood led to the establishment and rapid growth of ante-natal services throughout the world. Another activity of the hospital outside its routine work which called for special mention was the Home for Unmarried Mothers, Lauriston Park. In 1934 the home, which hitherto had been maintained by public subscription, was generously endowed as a memorial to Dr. Haig Ferguson. That the hospital had justified the public's confidence was made clear by the progressive fall in maternal mortality from the extreme of thirty-five deaths per 1,000 for the decade 1880–90 to eleven per 1,000 for 1936, and that despite an ever-increasing number of "emergency" as distinct from "booked" cases. As early as 1909 the directors intimated that they proposed to make an appeal for funds for building and equipping a new hospital which could adequately meet all modern requirements. It was not until 1926, however, that the managers of the Edinburgh Royal Infirmary submitted a proposal to the directors of the maternity hospital for the construction of a new hospital on the site of George Watson's College, and agreed that it should have associated with it in perpetuity the name "Simpson Memorial."

ENGLAND AND WALES

London's New Midwifery Service

On the first day of this year the new domiciliary midwifery nursing service for London came into operation. This new service, which is being provided by the London County Council under the Midwives Act, 1936, is designed to cover the whole of London, and therefore every London mother, irrespective of her financial circumstances, will now be able to call on the services of a fully qualified midwife to act either as a midwife or, if a private doctor is engaged, as a maternity nurse. The full fees proposed to be charged for the attendance of midwives are: £2 for a first confinement, £1 10s. for a subsequent confinement, £1 10s. for maternity nursing. Reduced fees will, however, be charged where the patient or liable relatives are unable to pay the full fees, and where the circumstances justify such action the whole of the fee may be remitted. Over 160 midwives will be employed under the scheme—forty-seven of whom will be employed directly by the L.C.C. and the remainder by arrangement with upwards of forty voluntary organizations. Co-operation with the existing maternity services of the Metropolitan borough councils forms an important part of the scheme, and the midwives will be encouraged to make the fullest use, for the benefit of their patients, of the various services provided by the maternity and child welfare committees of the borough councils. Leaflets giving the names and addresses of the midwives and also the names of the hospitals and district nursing associations with which the L.C.C. has an arrangement can be obtained by applying at the local town hall or public health department, any borough council maternity and child welfare centre, the County Hall, Westminster Bridge, S.E.1, or any of the L.C.C. hospitals.

Queen's Institute of District Nursing

A report on midwifery cases attended by Queen's nurses and village nurse-midwives and another on the nursing of notifiable and other diseases for which public health authorities have power to pay have been issued by the Queen's Institute of District Nursing; they relate to the year 1936. There was an increase of 2,814 in the number of midwifery cases attended in which no medical practitioner was engaged for the confinement, the total being 67,452. Of the 3,897 midwives concerned, 1,166 were Queen's nurses and 2,731 were village and other nurse-

midwives, a decrease of 89. Of the patients attended, 17,734 (26.3 per cent.) were primiparae. The number of maternal deaths was 174, corresponding to a mortality rate of 2.58 per 1,000 births and 2.65 per 1,000 live births. This compares rather more favourably with the figures for the two previous years; the rates attributable to sepsis being respectively 0.93 per 1,000 total births, 0.97 in 1935, and 1.25 in 1934. Seventeen patients died from non-puerperal causes, which reduced the maternal mortality from puerperal causes in 1936 to 2.33 per 1,000; the rate in urban areas was 1.58 per 1,000 and in rural areas 2.89. Of the total cases, 61,910 were in England, with a maternal mortality figure of 2.94 per 1,000, and 5,542 in Wales, with a mortality rate of 2.16. The number of times medical aid was requisitioned for mothers was 23,565 (36.7 per cent.), and for infants 4,119 (6.4 per cent.). The number of forceps cases was 4,287. As regards the causes of maternal death, 36.2 per cent. were sepsis (37.5 in 1935); and accidents of labour were 31.6 per cent. (28.6 in 1935); the eclampsia percentage was 11.5. Seventy of the fatal cases were not delivered by the midwife because it was necessary to summon medical aid before birth. Various difficulties were encountered due to failure of the patients to take advice, and it appeared that forty of the patients who died should have been booked with a doctor: five women refused adequate ante-natal care. The number of cases in which a medical practitioner was engaged and the midwife acted as maternity nurse was 32,504, representing an increase of 1,586 on the number for 1935. A considerable amount of home nursing was undertaken by Queen's nurses for notifiable cases. There was a slight increase in the number of pneumonia cases attended, and it was notable that there was only a difference of 7.1 per cent. in the recovery rate of those nursed in urban areas where hospital accommodation was easily available and in rural districts where the removal of the patient was much more difficult in cases of acute illness. Epidemics of measles in various parts of the country resulted in a large increase in the number of cases dealt with by Queen's nurses, but the proportion of children who afterwards developed pneumonia was smaller than usual. The large number of children under the age of 5 who suffered from non-notifiable diseases was very obvious, and it is concluded that this fact indicates that the medical profession, the local authorities, and parents are realizing more and more the necessity for trained nursing care, even in those conditions which might seem to be of less importance than the acute illnesses generally associated with infectious diseases. The total number of visits paid in respect of the nursing of cases of notifiable and other diseases for which public health authorities have the power to pay was no fewer than 1,027,152 in respect of 69,686 cases. Of these 14,479 were cases of pneumonia, while tuberculosis, uncomplicated influenza, and measles each accounted for over 4,000 cases.

The Heberden Society

A quarterly meeting of the recently formed Heberden Society will be held at the house of the Medical Society of London, 11, Chandos Street, W.1, at 8.30 p.m., on Thursday, January 13, when Dr. William Goldie of the University of Leeds will read a paper, illustrated by lantern slides, on "The *Streptococcus haemolyticus* in the Aetiology of Rheumatic Fever and Rheumatoid Arthritis." Dr. Mervyn Gordon, F.R.S., and others will take part in the discussion. All medical practitioners are cordially invited to attend. The society is composed of clinicians who are or have been working at the British Red Cross Clinic, Peto Place, N.W. Its object is the study of the rheumatic diseases, mainly from their clinical aspect. A limited number of medical practitioners who have not worked at the clinic but who are interested in the study of arthritis and allied conditions are eligible for election. Further particulars may be had from the honorary secretary, Dr. Kenneth Stone, 58, Chesterfield House, W.1.

Medical Society of London

The second half of the 165th session of the Medical Society of London opens on January 10 with a pathological meeting at 8 p.m. Discussions will be held at 11, Chandos Street, W., at 8.30 p.m., as follows: January 24, recent advances in surgery of the sympathetic nervous system; February 14, what can be expected of deep *x*-ray therapy; February 28, causes and treatment of flatulence; March 14, uraemia; March 28, diagnosis and treatment of lung abscess. The Lettsomian Lectures, on "A Survey of the Changes and Results of Treatment of Diabetes in the Last Fifteen Years," will be delivered by Dr. George Graham on February 21 and March 2 and 7, at 9 p.m. The annual general meeting will be held on May 9, at 8 p.m., and will be followed by the Annual Oration, on "Planning a Hospital," by Sir Henry Gauvain, and a conversazione.

Reports of Societies

FEMORAL EMBOLECTOMY

At the December meeting of the Liverpool Medical Institution, with the vice-president, Dr. R. E. ROBERTS, in the chair, Mr. E. N. WARDLE read a paper on femoral embolectomy.

Mr. Wardle traced the history of embolectomy from Suabanejeu's first attempt at the operation in 1895, and pointed out that most of the early operations had been upon the femoral artery; the first successful case recorded was that of Labey in 1911. Information collected during the war period upon the suture and ligation of injured blood vessels was of great importance, and the paper of Professor Key of Stockholm, in 1923, was the first authoritative review of a series of such cases; he had collected fifty-one from the literature, including twelve of his own. Geoffrey Jefferson of Manchester (*British Medical Journal* 1925, **2**, 985) later published a paper with a record of the cases observed since Professor Key's account had appeared. The condition usually occurred in patients with heart disease, but several cases had been observed in which this aetiological factor could not be found. The symptoms and physical signs of the lodgment of an embolus at the division of the common femoral artery were briefly described, together with the steps of the operation for its removal. It was emphasized that the success of the operation depended very largely upon the diagnosis being made and the embolus removed within two hours of its lodgment.

A patient was then demonstrated upon whom Mr. Wardle had carried out this operation in November, 1936. The points of aetiological interest were that the embolus occurred in the left femoral artery nine days after an operation for an injury to the right ankle; and that at no time did the patient show any evidence of a cardiac lesion. Four days after embolectomy he had pain in the chest, but no definite signs of a pulmonary embolus were ever found. He was shown to have now a comparatively normal circulation in the leg, without any swelling, even after being on the limb all day. The points put forward for discussion were: the source of the embolus, whether the femoral artery was now patent at the affected area, and whether it would have been just as effective to tie the vessel above and below the site of lodgment of the embolus and its associated thrombus.

General Discussion

In the discussion which followed Mr. F. RONALD EDWARDS described three personal cases in which the embolus was removed. The first case, a patient with

heart disease, had an embolism in the third part of the axillary artery, which was successfully removed. The second case had an embolism at the bifurcation of the brachial artery. Embolectomy was successfully performed with recovery of the limb; the patient, however, died three weeks later from cardiac failure. Section of the sutured artery showed normal healing in the wall and the presence of a satisfactory lumen. In the third case, with sudden disappearance of the radial and ulnar pulses, a clot was removed from the bifurcation of the brachial artery, but this case was unsuccessful, and later gangrenous changes became manifest in the other limbs. Brachial plexus block anaesthesia was used in all three cases.

Correspondence

The Science of the Health Resorts

SIR,—With reference to Dr. Alfred Cox's letter in the *Journal* of December 18, 1937 (p. 1249), may I say that a scheme of teaching was framed to meet the varying needs of students, practitioners, and specialists, and was adopted by the International Society of Medical Hydrology at its annual meeting in Austria in 1936. It has now been submitted by the society's representatives to Governments and universities in the constituent countries. Facilities for teaching are understood to include provision for necessary research. The society's scheme is as follows:

1. That elementary instruction in medical hydrology and climatology be given to medical students as a part of general therapeutics, and that opportunities be provided for visits to the spas, with practical demonstrations.

2. That postgraduate study be made available for physicians and general practitioners to enable them to choose the right cases for spa treatment and the right spa for the case, and that study tours to the spas ("voyages d'études médicales") be organized for this purpose.

3. That at one or more of the central universities in each country advanced instruction ("cours de perfectionnement"), both theoretical and practical, be made available for those wishing to specialize in one of the branches of hydrological practice.

4. That the teaching of medical hydrology be held to include the following subjects: (*a*) The properties of medicinal waters and their uses internally and externally (crenotherapy); the accessory physical methods which are used at spas and other health resorts, such as sun and air baths, manipulations, and exercises; and climatology. (*b*) The medicinal uses of water (hydrotherapy) in hospitals, municipal baths, and town clinics, sanatoria, etc. (*c*) The properties and uses of marine baths and climates (thalassotherapy) with accessory physical methods of treatment.

The society's proposals have evoked considerable interest. As Dr. Cox reminds us, in some countries university teaching of this character already exists, as in France. In others, where there are few or no spas, the study of climates on the coast or in the mountains is of major importance, especially in relation to delicate children from the towns. In England the University of London did a great work by bringing within the reach of students from all parts facilities for study and special qualification in many subjects that had no place in the ordinary curriculum. It was not the fault of the University of London that a lectureship in medical hydrology and climatology was not founded more than twenty years ago or twelve years ago. Such opportunities do not return.

At present the word "physical" is in the ascendant. It is proposed to push this sharply defined "science of the health resort" into the new physical omnibus. That word of many meanings is just now fully occupied with education, training, "jerks," and apparatus. Fortunately for another, better inspired, member of the physical family, radiology, it has missed the omnibus and is making good progress under its own colours.

But, Sir, there is a more serious side to this question. They say that in Germany half the people are now following "natural" ways of healing. *Absit omen!* But it may well be asked: Are the remedial powers of Nature no concern of the medical scientist? Should it not be one of the objectives of modern medicine to discover and restore our lost contacts with the energies in Nature? Persistence in a policy of separatism must mean increasing impoverishment to the medical body of any country. Perhaps it may be allowed to me to plead for unity in medicine, for inclusion rather than exclusion, not because it is expedient but because to my mind it is the only true ideal of our profession and is able to bring enrichment to its science and dignity to its practice.—I am, etc.,

London, Dec. 25, 1937. R. FORTESCUE FOX.

Applying for Hospital Posts

SIR,—Perhaps you will allow one who has had nearly forty years' experience as applicant or elector to say something in defence of the personal interview.

In the first place I entirely agree with some of your correspondents that the official testimonial is an anachronism and should be abolished. It has degenerated to a mere form, which is in most cases disregarded by the electing body. Secondly, where the field is a large one the "short list" should always be employed and ample notice given to the selected candidates: not less, certainly, than a week. But to ask any body of electors to elect from the "short list" without a personal interview, other than the official appearance before the election committee, is, I venture to think, a mistake. Any man who is going to work either with a fellow member of the staff or with a house officer may reasonably desire to see and talk with his prospective colleague before he is asked to give a vote. Therefore I think that for the limited numbers of the "short list" the personal interview must be retained.

The applicant, even if his candidature should be unsuccessful, must not suppose that the time devoted to the interview has necessarily been wasted. It has more than once been my fortune to be able to help an unsuccessful candidate on a later occasion owing to the favourable opinion I have formed at our interview.

Lastly, I venture to hope that the statements of one of your correspondents on the character of his reception represent a most exceptional experience. All members of a hospital staff have themselves at some time been applicants, and must surely have a genuine sympathy with their applicant callers, and a desire to make the interview a pleasant memory to both sides.—I am, etc.,

Basingstoke, Jan. 1. HUGH THURSFIELD.

Gastro-enteritis due to B. dysenteriae Sonne

SIR,—In view of the frequent mention of gastro-enteritis recently, I trust that the following case report will be of interest.

The illness appeared to begin in the evening of December 21 at a time when the patient, aged 26, was in his usual good health, with symptoms he described as being like a cold in the head with slight general bodily discomfort. He went to the office the next day (December 22), and was sent home in the afternoon on account of feeling weak and feverish, having had no lunch that day. In the evening he com-

plained of generalized severe myalgic pains, headache, and "hot and cold feelings." When seen he was in bed, shivering and with a flushed face, a dry furred tongue, and a dry hot skin; there was no sore throat or cough; the temperature was 104° F., pulse rate 80, and respiration rate 20. General physical examination revealed no other abnormal signs. The condition was thought to be influenza, or possibly malaria as he had been in India, where he had had, amongst other things, malaria, typhoid fever, and dysentery, amoebic and bacillary (Flexner, Shiga). He was given aspirin 10 grains and a hot drink. About midnight he felt very sick, for the first time apparently, and vomited. Later on in the night he vomited several times more and had diarrhoea—three or four liquid stools, brown and yellow in colour, with no blood, pus, or mucus, being passed. A blood film taken at the height of the temperature during the night showed no abnormality of red or white cells, and no protozoa. The urine was normal. The next morning (December 23) a purge was given, and soon produced a large watery stool, after which the patient said he felt much better. The temperature fell rapidly to normal, and after a slight rise that evening remained there. The diarrhoea was easily checked by a mixture containing belladonna, opium, and chalk, and the patient recovered rapidly except for some diarrhoea and griping abdominal pains for the next few days, due to his going on to a very full diet the day he was allowed to get up and go out—for which indiscretion Nature exacted full retribution in the form of a set of painful haemorrhoids.

Bacteriological examination (by Dr. C. W. Morley) of the stools taken on the third day of the illness (December 23) showed a large number (50 per cent.) of non-lactose-fermenting organisms, which after fermentation and agglutination reactions proved to be *B. dysenteriae* Sonne. The patient usually had his meals in various restaurants in the city, and insisted that his food was invariably of the very best. However, the night before his general malaise began (December 21) he dined alone at a strange restaurant, where he had a "made-up" meat steak, regarding the integrity of which he was not so certain.

The interesting features of this case are the unusual onset with a rigor simulating severe influenza or malaria; the comparatively late development of acute gastro-enteritic symptoms (that is, late on the second day); and the marked severity of the condition. It is thought that it would be of interest to record that an attack of gastro-enteritis of this nature could be associated with a definite *B. dysenteriae* Sonne infection, which is usually presumed to produce gastro-enteritic disturbances of mild degree.—I am, etc.,

St. Mary's Hospital, London, W.2, Jan. 1. THOMAS G. OSLER.

*** An article on Sonne dysentery, by Dr. Reginald Miller, appears at page 64 of this issue, and an annotation on the subject was published in the *Journal* of December 11, 1937, at p. 1176.—ED., *B.M.J.*

Use and Abuse of Antiseptics

SIR,—The two articles by Professor L. P. Garrod and Mr. Geoffrey Keynes on the use and abuse of antiseptics must have proved both interesting and instructive to a large number of medical practitioners.

Some months ago my complacency over hypodermic injections was rather disturbed by reading of a case of gas gangrene occurring after a varicose vein injection, and a case of severe cellulitis following an ordinary subcutaneous injection of, I think, morphine. It occurred to me that chloroform should be a good solution to keep both syringes and needles in, and I am now doing this. It is only necessary to pass them through spirit before using. This readily dissolves any of the drug remaining. I understand that chloroform is not only lethal to all forms of micro-organisms, but also to their spores, and perhaps one of your contributors could confirm or refute this.—I am, etc.,

Bristol, Dec. 29, 1937. CHARLES CORFIELD.

Who Owns X-Ray Negatives?

SIR,—In Dr. Asten's letter on the above subject in the *Journal* of January 1 (p. 47) the following statement appears:

"The radiologist, like the biochemist and the bacteriologist, and possibly others in a team, contributes his skill as an aid to diagnosis, and it is the opinion based upon such skill and knowledge alone for which payment is made, and not anything tangible such as a mere photograph."

In your footnote to this letter you quote, without adverse comment, a medico-legal correspondent as having said (when this subject was under discussion four years ago): "The point that the films had no intrinsic value seems sound as expressing the view that the patient pays for service and skill only."

So far as specialists are concerned, at any rate, these statements are surely founded on a misconception of the parts played respectively by the radiologist and the specialist in the investigation and treatment of a case. Take a fracture case, for instance. The surgeon sends the patient to the radiologist so that films may be taken and be available for the surgeon, to assist him in deciding the best method of dealing with the case. A report without the films is useless in most cases, no matter how eminent the radiologist. After setting more films are taken to enable the surgeon to decide whether the position of the fragments is satisfactory or not. Later yet more films are taken, again for the use of the surgeon, who alone has to take the responsibility of saying whether splints may be discarded with safety or not. The radiologist's report in most fracture cases is really superfluous. Now suppose the patient, before the treatment is completed, is obliged to move to a distant part of the country or perhaps go abroad—he expects, and rightly expects in my opinion, to take the films with him so that they may be at the disposal of the second surgeon as they were of the first. Supplying him with prints is not enough. Personally I feel sure that most patients with fractures visit the radiologist with no other idea than that films will be taken for the use of their respective surgeons. When the first set of films are taken at a hospital the position depends on whether or not the patient has paid for the *x*-ray examination. If he has not the films are the property of the hospital, and it is only by courtesy that they are placed, temporarily, at the disposal of an outside surgeon. If, on the other hand, fees have been paid at the hospital, the films should be at the disposal of the patient to take to any surgeon he may select. For many years I have acted on this view in talking to patients, and, almost without exception, they have had no difficulty in obtaining possession of the films.

When we turn to other conditions affecting bones and joints the position is not quite the same, since the radiologist's opinion is now of definite value, though the patient often does not realize this. In all such cases the patient expects the surgeon to examine the films and give his opinion on them. It is the surgeon who has to correlate the evidence the films provide with that gleaned from clinical and other sources, for he alone has to take the responsibility of advising the patient. The radiologist gives his opinion on the films essentially from the radio-

logical point of view. Though he naturally requires to know the chief facts in the history and clinical condition of the patient, he is not expected to make a complete clinical examination, or to assess the relative value of the evidence obtained from various sources, or to advise the patient what treatment is required. It is the fact that the radiologist is less likely to be swayed by other considerations and concentrates on the *x*-ray evidence that makes his opinion so valuable to the surgeon. If the two opinions on the films agree the patient is in all probability having a correct interpretation placed on this evidence. If the two disagree a consultation between the two types of specialist, always desirable, becomes imperative. Should the patient wish to get other opinions in this or any other country, is he not entitled to any and all of the films that have been taken?

I am well aware that the above description of the duties of a radiologist will not meet with the approval of some of our radiological colleagues, but they do express, I believe, the views of surgeons as a whole. Not for a moment is it suggested that as a matter of experience there is any difficulty put in the way of films being seen by any and every medical man whom a patient may wish to consult—far from it; but this is done in many cases purely as a matter of courtesy. Abdominal and chest cases, I imagine, call for special consideration, since the taking and interpretation of films form but a part of the *x*-ray examination. I have purposely confined myself to a class of case of which I have had experience. —I am, etc.,

London, W.1, Jan. 3. H. A. T. FAIRBANK.

Treatment of Burns

SIR,—Mr. P. H. Mitchiner's statement in his excellent article on the treatment of burns and scalds in the *Journal* of January 1 (p. 27), that gentian violet does not produce coagulation, must have caused considerable surprise to all who have had opportunities of using this method.

It is true that this dye was not introduced for its coagulant properties but primarily as an antiseptic; it was found, however, that in addition to any antiseptic properties it possessed it also formed a tough, firm eschar similar in many ways to that produced by tannic acid but also having certain advantages over the latter. Briefly, these advantages are: (1) The eschar is flexible, and in spite of the increased movement allowed there is less liability for cracking to occur over the flexures. (2) It does not contract as much as does the eschar formed by tannic acid, and hence in those cases in which a burn completely encircles a limb there is less liability to swelling and oedema. (3) The presence of underlying sepsis can be diagnosed more easily and suitable treatment instituted earlier. (4) Gentian violet is said to be less destructive to isolated islands of epithelium.

These are some of the advantages of gentian violet considered as a coagulant, but in addition it is an antiseptic, which tannic acid is not. A further point worth mentioning is that an aqueous solution can be preserved indefinitely, but even with the addition of antiseptics tannic acid rapidly deteriorates. The chief disadvantage that I have found lies in the fact that gentian violet is a dye, and not only the patient but everything that comes in contact with him acquires a purple colour which is very difficult to remove.—I am, etc.,

London, W.2, Jan. 3. GERALD H. C. OVENS, Surgical Registrar, St. Mary's Hospital.

Treatment of Psychoneuroses

SIR,—The pronouncements of Dr. T. A. Ross (*Journal*, December 18, 1937, p. 1247) on the subject of psychotherapy cannot fail to be of peculiar interest, for most of us are familiar with Dr. Ross's work, *An Introduction to Analytical Psychotherapy*. With Dr. Ross's main thesis—namely, that a large proportion of psychoneurotic patients are readily amenable to treatment of a comparatively brief duration—I am in cordial agreement. Indeed, I am strongly of the opinion that the difficulties of this form of treatment have been in the past, and are still, grossly exaggerated. To state, as one of your correspondents does, that "the psychological approach is still a tortuous by-way without any guideposts" seems to me, to say the least of it, a considerable overstatement of the case. Surely the stream of psychological literature which has poured forth from the medical presses of this country, of America, and the Continent ever since the war should have helped a little to blaze the trail if not to make a well-worn path. In view of this wealth of literature and the diversity of opinions which it implies it would appear that the practice of psychotherapy is a highly individual matter, and one which, except in its main outlines, cannot in the last resort be taught or communicated to another. Such at least has been my personal experience; and in such modest *exposés* of my methods as I have at times essayed I have been acutely conscious that though the general scheme of approach was communicable the real essence of my treatment somehow eluded explanation. To those psychological purists who deprecate the intrusion of a personal factor on the part of the operator this of course will be sheer heresy. So far, however, from making any apology for such an attitude, I see no reason why one should not enlist the full resources of one's personality in the practice of psychotherapy as in any other form of treatment. Further, I would suggest that those (mainly psycho-analysts) who fondly imagine that they have freed themselves from every trace of what I suppose one must call transference take perhaps an unduly sanguine view of the situation.

To come to less controversial matters, I think that the function of psychotherapeutic clinics is definitely limited. The mere number of cases to be treated renders this necessarily so, and I quite agree with your correspondent Dr. E. Fretson Skinner (December 11, 1937, p. 1196) that the out-patient clinic in its present form provides no solution of the problem, though I think it might be of definite service as a sort of clearing-house. The only kind of clinic of which I have had any experience is the Ministry of Pensions Clinic, instituted for the treatment of war neuroses. Judging by that experience, I should imagine that the type of material which presents itself at such a clinic as the one at Sheffield would be extraordinarily diverse. If, however, the clinic did no more than recognize and segregate the cases of indubitable psychosis and potential psychosis, it would still perform a considerable service. Cases, for instance, of manic-depressive psychosis with suicidal tendencies, euphemistically described under the term "nervous breakdown," might at last be recognized for what they are, and so enabled to live out their legitimate term of years. Essentially, however, the treatment of the psychoneuroses is an individual matter and one which does not fit in readily with the ordinary routine of general practice. Its proper milieu and atmosphere are provided neither in the crowded clinic nor in the busy consulting-room of the ordinary practitioner. For this and other reasons it would seem that the treatment of

the psychoneuroses is likely to remain the province of those who devote themselves solely or partially to this specialty.

I think that the profession as a whole is fully alive to the extent to which a neurotic element enters into many disorders where it would not *a priori* be suspected. So far from underrating this possibility, there seems to me a great danger of exaggerating the part it plays. In an age when such terms as "inferiority complex," "escape from reality," "fantasy formation," and the like are on everybody's lips there seems little likelihood of overlooking the psychological aspect of things.—I am, etc.,

Leeds, Dec. 27, 1937. J. E. MIDDLEMISS.

Hormone Treatment of Prostatic Hypertrophy

SIR,—While acting as ship's surgeon on a voyage to Buenos Aires I came across a passenger who was doing the round trip for the benefit of his health.

He had been advised to undergo an operation for enlarged prostate, but owing to bronchial trouble a sea voyage had been ordered before the operation. Having recently read in a French journal of some successful results from hormone therapy, I suggested giving him a course of treatment if I could procure a preparation of testosterone salts in Buenos Aires. I succeeded in obtaining the testosterone propionate in sesame oil. Before starting treatment I verified the fact that he was suffering from a hypertrophied prostate with incomplete chronic retention. At first I limited the injections to two a week; after the sixth injection the nocturnal frequency of micturition was reduced from six or seven times to once, and the dysuria had decreased. The pain and heaviness over the bladder region also disappeared. I then gave him three injections a week. After the twelfth injection, in addition to the functional improvement there was also a decrease in the size of the prostate, and his physical and mental condition showed a marked improvement. I administered six more daily injections until there was an indication of overstimulation. I think I might say that on arriving in London the patient was very grateful.

The conclusion may be drawn that hormone therapy, at least in uncomplicated cases of prostatic adenoma, is satisfactory and free from ill effects.—I am, etc.,

S. M. DOWLING, M.R.C.S., L.R.C.P.
Woodford Green, Dec. 28, 1937.

Causation of Rickets

SIR,—In your annotation on perspectives in biochemistry (*Journal*, December 25, 1937, p. 1285), which, however, does not profess to be a comprehensive one, there is no reference to the article by Sir Edward Mellanby in which he reiterates his belief in the existence of the so-called "cereal-factor" or "toxamin" as a potent agent in the causation of rickets. It is possible to disagree with his views for the following reasons.

The time taken by the human infant to double its birth weight is 180 days, that for the puppy-dog nine days. Corresponding with this, the milk of the human species contains 1.6 per cent. protein and 0.035 per cent. calcium, while the figures for that of the bitch are 7.1 per cent. and 0.241 per cent. Sherman suggests that for the child of 3 years and upwards an allowance of 1.0 gramme of calcium, in the form of a quart of cow's milk, should be given each day. Considering the rapid growth of the young dog and the likelihood that a puppy, a few days old, of one of the moderate-sized breeds could easily drink in a day 100 c.cm. of bitch's milk, containing 0.241 gramme of calcium, an allowance of 1.0 gramme of calcium a day for the puppy of from 6 to 7 weeks and over would not seem to be excessive. In Sir Edward Mellanby's 1925 paper (M.R.C. Special Reports, No. 93), however, we find that the amount of calcium supplied each day to puppies of 6 to 7 weeks and over was of the order 0.045 to 0.085 gramme. In harmony with this and due essentially to the existent calcium deficiency, as I have previously pointed out, the condition exhibited in the rib sections illustrating this report is one of atrophy and osteoporosis only, without, so far as I can observe, there being any evidence of the presence of rickets.

On these grounds, as well as on others which space will not allow me to discuss here, I have serious doubts as to the reality of the existence of the "cereal-factor" or "toxamin," and as to the part that it is alleged to play in the production of rickets. These remarks, which apply equally to the case cited above in which osteomalacia was produced in adult dogs on somewhat similar diets, are based on an article of mine which was published in the *British Medical Journal* (1933, **2**, 599), and on one by Emslie and myself in the *Biochemical Journal* (1934, **28**, 1503).—I am, etc.,

Aberdeen, Dec. 12, 1937. J. P. MCGOWAN.

The Problem of the Final M.B., B.S.Lond.

SIR,—After reading Dr. A. M. H. Gray's letter (*Journal*, December 25, 1937, p. 1300) I wish in thanking my nominators to assure them that I intended no discourtesy to anyone, and certainly not to Dr. Gray, to whose comradeship and military teaching I am so greatly indebted.

I had thought my views on this subject were realized, as I have never been at pains, when it has been mentioned in my presence, to conceal that while in no way averse to reciprocation between all the bodies whose students enjoy the facilities of the London medical schools, I should view with dismay any proposal for co-operation between only two or three of them as being unlikely to be to their advantage, or to enhance the prestige and popularity of their degrees. I have therefore viewed with increasing anxiety the proposals for such a partial agreement, and so find myself, in this matter, at one with the Graduates' Association.—I am, etc.,

London, W.1, Jan. 1. PHILIP H. MITCHINER.

SIR,—In your issue of December 25, 1937, Dr. A. M. H. Gray makes an attack upon the University of London Graduates' Association, for the actions of which as President I take full responsibility, and I would ask you therefore to allow me to answer him.

Shortly after Mr. Mitchiner's adoption as the association's candidate he handed to the clerical staff of the association a batch of nominations (including Dr. Gray's) for publication with his election address. In conversation with Dr. Gray some considerable time after the issue of the association's circular he told me that while dissenting from Mr. Mitchiner's views, with which he had been long familiar, on the particular issue of co-operation with the Royal Colleges, he warmly desired his election on personal grounds. He made no protest to me regarding the inclusion of his own name in the list of nominators, and his letter in the *British Medical Journal* was the first intimation that I received of his objection to what he must know is the usual procedure in University elections, in which nominations of candidates are published and are invited for no other purpose.

Dr. Gray seems to hint that other persons in that list besides himself feel aggrieved. Out of 113 nominators concerned only one withdrew his name after the publication of Mr. Mitchiner's address. The feeling of the graduates to whom the circular was sent may be gauged by the fact that within a few days of the circulation of the address, and several weeks before polling day, considerably more than one-third of the whole *accessible* electorate had signified in writing their intention to vote for Mr. Mitchiner and their desire to add their names to any list of his supporters. There can be no question that the policy announced by the association and by Mr. Mitchiner commands the overwhelming support of the electorate. Perhaps it was knowledge of this fact which deterred Dr. Gray and his friends from bringing forward a candidate in support of their views and in opposition to Mr. Mitchiner.

Dr. Gray accuses the Graduates' Association of being unconcerned with the interests of education and of the students of London University. The primary purpose of the association since its foundation nearly forty years ago has been to defend the interests of graduates. That it has done so is clear from the response the graduates have made from time to time, especially during the last fifteen years that I have been president, in support of candidates nominated by the association in University elections for Parliament, for the Senate, and for the Standing Committee of Convocation. But it is surely rash of Dr. Gray, who apparently is in favour of a change that would degrade the final University examination in medicine to the level of the Conjoint diploma, to reproach the association, which desires to maintain that examination at its present high degree-level, with indifference to the interests of education and of students of the University who are destined to become graduates and who are vitally concerned to maintain the status of their degree.

I submit, Sir, that on the more important question, the "problem of the final M.B., B.S.Lond." as you have described it, Dr. Gray is unacquainted with, and consequently misrepresents, the facts. The University Grants Committee transferred to the Court of the University as long ago as 1929 the office of Mentor of the Schools, together with the function of distributing grants to those schools. Dr. Gray is mistaken both as to the source of the complaint and the terms in which it was made. The latest pronouncement of which I am aware on this question was made by the Court to the Senate in December, 1936, in the following statement:

> "In making their grants to schools, the Court's attention was again directed to the small number of students in medical schools who take a university degree, and the Court resolved that, in communicating to the medical schools the Court's decisions with regard to grant, those schools be informed that the Court have noted with regret that in comparison with the rest of the country the number of London students who achieve a university degree is very low; that they are aware that the causes contributing to this are many and complex; that the recent changes in the scheme of the examinations of the University may have the effect of making a degree more easily accessible; and that the Court hope that at the end of the next quinquennium the figures will show an improvement."

The final paragraph, in its suggestion that the recently revised medical curriculum would have the effect of making the degree "more easily accessible," and that the improvement could not very well be manifest "until the end of the next quinquennium," contradicts, in my submission, Dr. Gray's suggestion that pressure is being exercised on the University by any grant-giving body. The very temperate and sober statement by the Court, especially in its last sentences, gives point to the letter from my colleague Professor Greenwood in your issue of January 1. It is the Board of the Faculty which in completely ignoring that very important and laborious revision is, in fact, flouting the advice of the Court.

The real explanation for the relatively "small number of students in London medical schools who take a university degree" is to be found, as the Haldane Commission quite explicitly stated, in the circumstance that the Conjoint Board of the Royal Colleges offers to London medical students a qualification to practise of lower standard, exacting a shorter period of training and rendered more accessible by, among other factors, the greater frequency with which the Conjoint Final Examination is held as compared with the M.B., B.S. (four times a year as against twice a year). This competition of a lower qualifying examination with the M.B., B.S. has become less serious in the last few years; stirred by a growing consciousness of their responsibility to the university from which they derive so large a proportion of their income, the London medical schools are increasingly restricting their admission of students to those entering for a university course, either of Oxford, Cambridge, or London, and this rule is likely to become universal. Whereas at the date of the Haldane Report less than one-third of the students at London medical schools were undergraduates of London University, at the present time the proportion of such undergraduates varies from 93 per cent. to 49 per cent., the average for the twelve schools being over 70 per cent.

The position is thus immensely better than it was when the Haldane Commission reported. Moreover, in that report it is stated that "the average annual entry of University of London students in the London medical schools for the quinquennial period ending 1909 was 80," including women students, who constituted a very considerable proportion. The last issue of the *University Calendar* shows that in the twelve medical schools there are now no fewer than 2,890 students entered for the London degree, a figure which indicates that the average annual entry for the quinquennium ending with 1937 was approximately 500—six times as large as in 1909.

Professor Greenwood very pertinently points out that the Colleges as corporations are licensing, not teaching bodies, and "can make little contribution to the solution of an educational problem." In this connexion it is important to note that the Commissioners who framed the present Statutes for the University, following the Haldane Commission, deliberately eliminated the representation of the Royal Colleges upon the Senate previously enjoyed by them, and by so doing clearly indicated their conviction that a complete educational separation between the Colleges and the University was desirable. With Mr. Mitchiner's election to the Senate there will be eight medical members of that body; they are likely to be evenly divided upon this question of co-operation of the University with the Colleges, and no clear medical lead can result. Dr. Gray seems to suggest that there is no harm in bringing forward this proposal for co-operation because the other members of the Senate can be relied upon to defeat the proposal if its defeat is desirable. That seems to me a curious encouragement for its presentation, and as he himself says the objections to it are many and various and may well prove "insuperable," I find it increasingly difficult to understand what motive can explain the persistence with which Dr. Gray and his friends are pushing it.—I am, etc.,

London, W.1, Jan. 3. E. GRAHAM-LITTLE.

Opportunities for Women in Medicine

SIR,—"Cambridge Woman Graduate's" letter in the *Journal* of December 25, 1937, raises a vexed question. In its wider implications, however, apart from Cambridge graduates in medicine, the grievance is not a new one. To put it plainly, women, as a rule, are tolerated, not welcomed, in the medical profession, or, with a few outstanding exceptions, in its lower ranks only. To take the Public Health Service, in which I happen to have been in the past most interested, there are few, if any, of the higher appointments, such as medical officer of health in the counties or county boroughs, held by a woman. There are, indeed, assistantships in plenty, but it is depressing to work for years with no prospect of promotion, it may be, subordinate to one who is only superior by virtue of his sex; and these remarks apply, *pari passu*, to other branches of the profession, such as honorary posts in hospitals, which naturally go to alumni of these hospitals, most of which are closed to women undergraduates.

I may add that being off the active list, having started my medical career in the 'nineties, I have no axe to grind, but I cannot but feel that even now, when many more posts are open to them than was the case in the past, women are still *caeteris paribus* at great disadvantage in competition with men in the medical profession. I could enlarge at further length on the subject if your space permitted.—I am, etc.,

Sussex, December 25, 1937. EVA MCCALL.

SIR,—I was delighted to read in the *Journal* of December 4 (p. 1124) of the opportunities for medical education afforded to women students at the new West London Medical School, and agree with the writer of that article and with several of your correspondents that such facilities are long overdue. But there is still cause for anxiety. The injustice of the present position—"that women are deterred from entering the profession"—is made clear by the article, and the unfairness of past events hinted at—"the experiment . . . was tried . . . and abandoned . . ."—though just how unfair those happenings were can only be known to those who, like myself, were actually working at a hospital while an anti-women campaign was being conducted. In view of all this, it is disquieting to learn that "there is no present intention of confining the school to women students" and that "the future development of the school in this respect cannot be foreseen," though if there are lessons to be learnt from history in this case they might be foreseen only too clearly. In plain language, is there any guarantee that these twenty-five places, or any proportion of them, will be reserved for women students, not only now but in the future? Unless this is assured, can we expect the women to believe that they are not being made use of in an emergency, only once more to find the doors shut against them when their usefulness has passed?—I am, etc.,

DOUGLAS E. BARTON, M.B., B.S.

Morden, Surrey, Dec. 28, 1937.

Correct Footwear

SIR,—One item of women's clothing stands out prominently as responsible for discomfort and disability. It is the shoe, and in particular the toe of the shoe. Take the shoes of a small child and of a woman. Compare the shapes of the toes, and it will be seen that in the latter there is insufficient toe-room. Look at the plantar aspect of the toes of the average small child and compare it with that of the average woman. In the former the toes are separate and straight, in the latter there is evidence of lateral compression-cramping and some degree of deviation from the straight. The inner border of the shoe should be straight up to the level of the tip of the great toe. If it deviates outward it will in time produce some degree of valgus deformity. Where this deviation is great, as in the shoe with the comparatively sharp mesial point, gross deformity will result in the course of time. Long years of wearing anatomically incorrect shoes will in many cases spoil the feet and rob them of beauty. It may be years before symptoms send the patient to seek advice, and by that time deformity is established and restoration of form and function well-nigh impossible.

Fashion decrees for women's feet a shape of shoe-toe which is anatomically incorrect, and which is the chief factor in altering the shape of the toes. Where this alteration is great it is accompanied by other changes in the feet which, but for the offending shoe, need never have occurred. To preach to the unwilling in private practice the doctrine of the straight inner border is unprofitable and a mere beating of the air. To attempt to lessen the amount of disability due to preventable foot troubles it is desirable that the manufacturers should put on the market a model acceptable to women and at the same time anatomically correct. Education as to correct footwear and the ills which follow the use of the incorrect should, in the course of years, bear fruit and stimulate a demand which is at present all too small. The Ministry of Health should have figures and be able to assess the amount of trouble arising from "bad" shoes, and will be able, too, to judge if it would be worth while to arrange for annual "foot" lectures by expert lecturers to the senior classes in girls' elementary schools and secondary schools throughout the country. I plead for room for the toes. May the importance of toes and shoes receive due notice in the national fitness campaign! Here is a field for preventive medicine, and at low cost. Once correct shoes have achieved popularity they should cost no more than to-day's shoes. There remains only the cost of the essential education. Results would not come quickly, but by 1980 figures should be starting to show a drop in the number of chiropodists and in the number of operations for hallux valgus!—I am, etc.,

Worthing, Dec. 30, 1937. C. GIBSON.

SIR,—In the *Journal* of December 11 (p. 1198) Dr. Thomas Marlin tells us that many disabilities may be traced to foot-discomfort; he is certain the whole construction of footwear requires alteration. Dr. Tom Hare (December 25, p. 1302) insists that the medical profession should direct the correct shoeing of mankind. It is safe to say that over 90 per cent. of women in this country and in all classes of society show obvious deformity of the feet. The commonest deformity is a crowding together of the tips of the toes; instead of lying side by side and separate, as in bare-footed tribes, the little toe is deflected inward, the great toe outward, while the intermediate toes to which prevailing shoe-fashions allot no space assume the well-known "hammer" form. Constant pressure upon abnormal projections thus arising leads to corns, bunions, and other painful local reactions that give constant employment to an army of chiropodists. Especially common is a large and hideous projection at the metatarso-phalangeal joint of the great toe. The same, though to a lesser degree, is true of many *men's* feet. To remedy these troubles is difficult, but prevention is simple, so simple that it seems ridiculous to have to

state it. It is to make shoes that will accommodate the toes in their normal alignment, with room for them to move within the shoe. To achieve this, the inner border of the shoe must be quite straight, because the big toe lies, normally, in the line of progression. Such a shoe is known as a "sandal-form" shoe. No walking shoe of this shape is displayed by any of the big shoe firms because it is not fashionable, and considerations of fashion are far more powerful than those of comfort or health. Correct shoes need not be expensive; they wear well and keep their shape since they have not to withstand abnormal pressures as with "fashionable" shoes.—I am, etc.,

London, W.1, Dec. 29, 1937. ALFRED C. JORDAN.

SIR,—In connexion with Dr. Thomas Marlin's letter on this subject (*Journal*, December 11, p. 1198) I should like to give the results of seventeen years' experience with marching boots for soldiers.

There are racial differences in the length and width of feet. A fair proportion of young soldiers start their army careers with toes already retracted or deformed by civilian boots or shoes. Permanently cramped, retracted, deformed, or ankylosed (including hammer) toes are more common than many people would care to admit. In order to conform to civilian "fashion" army boots are generally too tight over the toes for comfort. I have had experience of three types: (1) British boots, (2) French boots, both of which are rather narrow over the toes for the normal foot, and (3) American boots, which are wide over the toes but are too heavy. A soldier, therefore, has to choose either a pair of boots which fit at the heel and cramp the toes, or else a pair which fit easily and give room for the toes but are loose at the heel. The result is that after marching, say, ten miles he will probably have blisters on the toes in the first case, or on the heels in the second.

The boots should always fit at the heel and should be wide enough to enable the toes to expand to their natural limit when marching, as they would do if the feet were naked. In most cases compression of the toes reduces the circulation, and after a long march oedema may be seen above the ankle, or sloughing of portions of the skin between the toes, or there may be cheesy deposits. This interference with the circulation can also be the cause of varicose veins of the leg. I have even seen a case of osteomyelitis occur after a march of several weeks from septic abrasions over one or more of the small bones of the foot.

Some time ago I went to a surgical bootmaker and got him to make me a pair of "experimental boots" fitting close at the heel and being extra wide over the toes. As a result there was complete circulation and ventilation in the boots by the unimpaired movement of the toes. After long marches my feet were warm and comfortable and the socks were dry, and I was one of the very few who were not dog-tired, since pain and discomfort cause fatigue. The bootmaker measured my instep and made the uppers accordingly. I have a high instep, and the uppers did not meet for lacing. He had evidently been making boots for "flat-footed" people, in which case the instep is supported by the sole. By introducing two fingers under the tape during the second measurement this shortness in the width of the uppers was rectified.

New marching boots should be steeped in a pail of water for forty-eight hours when the tannin and other chemicals used in "curing" produce a dark-brown colour in the water; they can then be dried and "dubbined." The type of shoes seen in bootmakers' windows for children of tender years, which are somewhat spatulate over the toes, do not look ungainly, and if the style in boots and shoes for grown-up people could be changed to this pattern a new generation would grow up with normal feet.—I am, etc.,

London, W.1, Dec. 17, 1937. G. G. COOPER.

Partial Glossectomy as a Cure of Stuttering

SIR,—I read with interest Dr. William Brockbank's account (*Journal*, December 18, p. 1239) of the operation advocated in 1841 for the cure of stammering. There is no logical reason why it should not correct the stammering habit, but the adoption of such a course indicates complete ignorance of speech training. The hangman can cure indigestion, but there are other and better methods!

The two main factors in speech and song are the production of the vocal tone in the larynx and the moulding of that tone into words during its passage through the mouth by movements of the tongue, lips, and jaws. Perfect speech and perfect song depend upon maintaining a correct balance between these factors, which may be said to be conflicting, inasmuch as the continuity of the vocal tone is necessarily broken for the pronunciation of the explosive consonants, which are the particular bugbear of the average stammerer. In a less degree the vocal tone is checked for all the other consonants. In contrast, we are all familiar with the singer who is concentrating on vocal tone and neglecting his word formation. The same organs are used in speech and song, but in speech the tendency is to concentrate on the words and to neglect the voice, while in song the opposite is found. In nearly every case the stammerer can sing fluently, because if he concentrates on vocal tone rather than on word formation he corrects the loss of balance. His tongue, lips, and jaws have been too active in comparison with his larynx; since the tongue is the chief agent in consonant production, it is easy to believe that if the mobility of the tongue is curtailed surgically it will help to re-establish the correct balance. Anyone who has had a dyspeptic ulcer of the tongue will remember the efforts subconsciously made to modify the tongue movements in speech. It is obvious, however, that since the same organs are used in speech and song the stammerer who can sing must need very little readjustment to enable him to speak.

It must be remembered that the stammerer can very often mimic dialect and accent, the reason being that he is then compelled to pay more attention to the vowel sounds, for which the vocal tone is resisted in a less degree than in the case of the consonants. This again substantiates the theory that stammering is a habit of unbalanced speech, and that the obvious method of correction is to establish correct balance.—I am, etc.,

London, Dec. 22, 1937. H. ST. JOHN RUMSEY, M.A., Speech Therapist and Lecturer at Guy's Hospital.

Morsier and Junet (*Schweiz. med. Wschr.*, Oct. 16, 1937) describe two cases of myoclonus of the pharynx and larynx. In both the movements were rhythmical, symmetrical, longitudinal, and regular, occurring from forty to two hundred times a minute. The movements are due to simple muscular contractions. They are not influenced by respiration, and it is not known whether they occur during sleep, but they sometimes stop during voluntary movements—for example, deglutition. They are produced most commonly as a result of arteriosclerosis or of inflammatory lesions.

Obituary

H. B. BUTLER, F.R.C.S.ED.

Senior Surgeon, Royal Surrey County Hospital, Guildford

The untimely death of Harold Butler on Christmas Day was a shock to his colleagues and many friends. For over thirty years he had worked for the people of Guildford. His great surgical skill, kindliness of heart, and selfless care of his patients, both in and out of hospital, had endeared him to hundreds of people in the district. The crowded cathedral church on the day of his funeral bore witness to their affection.

Harold Branson Butler was born in Guildford on October 13, 1875. After leaving St. Paul's School he went on to Sidney-Sussex College, Cambridge. Wanderlust lured him to New Zealand for a while, after which he returned to study medicine at St. Bartholomew's Hospital, taking his M.R.C.S., L.R.C.P. in 1901. After a short period in general practice at Buckingham, and later as medical officer at Powick Asylum, he returned to Guildford to assist his father in his practice. Always surgically minded, he took the Fellowship of the Royal College of Surgeons of Edinburgh in 1903, and devoted himself to developing his skill in surgical technique and diagnosis. By visits to surgical clinics, including Lord Moynihan's at Leeds and that of the Mayo brothers in America, he and his colleague Mr. Eric Sheaf made themselves familiar with the latest surgical methods. They were thus able to raise the standard of provincial surgery at Guildford to a very high level.

For over thirty years Mr. Butler has worked assiduously at the Guildford Hospital, never sparing himself by night or day, always finishing his list, even when fatigue warranted his leaving some work to his deputy. This ultra-conscientiousness surely left its mark on his strong constitution. An attack of double pneumonia two years ago should have warned him to conserve his energies, but his work, especially his hospital work, came first, and he worked just as hard until a few days before Christmas, when his cerebral arteries gave way.

H. B. Butler had been a member of the British Medical Association for thirty years. He was president of the Surrey Branch in 1925–6 and chairman of the Guildford Division in 1927–8. He contributed some valuable papers to the medical journals, notably those on shock and gastrectomy. He was a justice of the peace for Guildford, and rendered valuable service to the town. For his work with Red Cross hospitals during the war he was made an M.B.E. He is survived by his widow, *née* Hilda Bethune Denham Smith, and his son Denis and daughter Audrey (Mrs. John Parker). His colleagues at the Royal Surrey County Hospital have lost a fine surgeon, a lovable colleague, and an unselfish friend.

T. B. J.

[The photograph reproduced is by J. Cecil Gould, Weybridge.]

MALCOLM BRICE SMYTH, M.B., B.CH.,

Physician, Belfast Hospital for Sick Children

It is with regret that we record the death, on December 21, 1937, of Dr. Malcolm Brice Smyth, at his residence in University Square, Belfast. It was only a few weeks ago that he was carrying out his ordinary routine, and now an illness of two months' duration has removed one of the best examples of the family doctor, a physician loved and esteemed by his patients and by them regarded as healer and friend.

Malcolm Brice Smyth was a student of Trinity College, Dublin, graduating B.A., M.B., B.Ch. in 1900. He acted as house-surgeon in the Royal Victoria Hospital, Belfast, with a view to a career in surgery, but he gave up his interests in surgery to carry on the family practice on the sudden death of his brother, Sidney. Notable as an active sportsman in his youth, he maintained his interest in shooting and fishing until within a few weeks of his death. With his patients he was the personification of kindness, and earned their love and devotion—not from an excess of sentiment, but because of an exceedingly practical mind that saw when the need was greatest and where help could be best applied. His father was co-founder of the Belfast Hospital for Sick Children with the late Sir John Fagan, and all his life Malcolm Smyth maintained a deep and earnest interest in the welfare and progress of this institution, which has steadily established itself as one of Belfast's outstanding charities over a period of sixty-five years. He succeeded his brother, Sidney, who was honorary physician to the hospital, on his death, and for nearly thirty years was a member of the medical staff of this hospital so intimately connected with the name of Brice Smyth. For several years he was on the surgical staff of the Belfast Maternity Hospital. To it he rendered valuable service as one of the best obstetricians in and around Belfast. Some years ago he resigned from the active staff, and had since been an honorary consulting surgeon to the newly developed and reorganized Royal Maternity Hospital. He was a vice-president of the Section of Diseases of Children at the 1937 Annual Meeting of the British Medical Association in Belfast. Sincere sympathy is felt towards his widow and their three daughters.

Mr. Howard Stevenson, F.R.C.S., writes:

The death of Malcolm Brice Smyth leaves a blank not only in the ranks of the medical profession in Belfast but among a large circle of friends. His medical education took place at Trinity College, Dublin, where he had the distinction of being captain of the rugby fifteen. After graduating in 1900, Smyth returned to Belfast, where his father and brother were engaged in practice, and obtained a resident post in the Royal Victoria Hospital. He early displayed a keen interest in diseases of children, and was elected visiting physician to the Belfast Hospital for Sick Children, a position he held until his death. Enjoying a large practice, Smyth belonged to that small group, now unfortunately dying out, the old-fashioned family doctor. His relation with his patients was much closer than that of merely a physician—he was their confidant and friend. His loss in this respect will be much felt. Shooting and fishing were his relaxations; at both he excelled. He was never happier than when out for the early morning flight of duck or casting a fly over a pool. I think we must look to these sporting instincts to account for much of his great popularity among his friends. It was impossible to be in Smyth's company without realizing his charm of manner and tolerant outlook; it was equally impossible to imagine him doing a mean act or speaking an unkindly word.

We have received from Bristol the following note supplementing the obituary of Professor GEORGE BUCKMASTER, which appeared last week at page 48: Buckmaster published a number of papers on blood pigments and their derivatives, and spent considerable time on the blood gases, for which work he and J. A. Gardner devised their tapless blood-gas pump—an instrument designed to avoid experimental errors through leakage. He was specially interested in the carriage of CO_2 in the blood, and pointed out the possibility of this gas combining with haemoglobin. He also studied chloroform anaesthesia and the blood gases during anaesthesia. In 1919 he was appointed Professor of Physiology in the University of Bristol, a post he held with great distinction for ten years. Buckmaster was essentially a student and a philosopher, with no time or interest for utilitarian affairs. A great and compelling teacher and a much-loved colleague, he became a very part of the life of Bristol University. He was a brilliant and witty conversationalist, and it seemed a cruel irony of fate that his last illness left him for months completely aphasic. He married Miss Amy Elizabeth Brooks, and had one son and one daughter. His son died as a victim of the war in 1919. His daughter, after taking her medical degrees, married Dr. Ronald Tasker.

We regret to announce the death on December 14, 1937, after an illness of only two days, of Dr. GEORGE BURROWS BROWN, aged 58. He was educated first at Rossendale Grammar School, and afterwards at Durham University, where he graduated at the early age of 21 years as M.B., B.S. Then he proceeded to the West Indies, where he practised for four years. On his return to England he practised in Manchester. On the outbreak of the great war he joined the R.A.M.C., and served as a temporary captain on all fronts; on the termination of the war he retired with the honorary rank of Captain R.A.M.C. He was medical officer of health for Failsworth for ten years, when he retired to Worthing. After some years' rest on account of ill-health he decided when his health was regained to start practice in Worthing, and was appointed district medical officer. Dr. George Brown was much loved by the poor, to whom he was ever kind and generous. He leaves a son and two daughters; the younger daughter, Mary, is a student in her fourth year at Sheffield University. His brother, Dr. J. Percival Brown, practises at Bacup.

Dr. JOSEPH HAROLD ASHWORTH, D.P.H., died on December 18, 1937, after a long illness, at his residence in Kersal, Manchester, aged 67. Educated at Manchester Grammar School and Owens College, he graduated M.B., Ch.B.Vict. in 1894. As a student he represented the then Owens College at lacrosse, and was on two occasions a member of the side which was beaten in the final of the Senior Flags competition. After a short period of residence at the old Clinical hospital he left to take over the practice founded in Cheetham Hill by his elder brother, the late Percy Ashworth, M.D., F.R.C.S. He remained in practice without interruption till 1916, when he volunteered and was accepted for foreign service in the R.A.M.C. He went to France as lieutenant attached to the 57th General Hospital in 1916, but was invalided home with myocardial deficiency in 1917. His heart and general health never fully recovered, and he was obliged to give up the strain of a busy general practice in 1920, since which date he lived in semi-retirement in Kersal. Dr. Ashworth married in 1901 Bertha, youngest daughter of the late P. J. Ramsay, J.P.; she died in 1927. He is survived by a daughter and two sons, the elder of whom, Dr. H. K. Ashworth, is visiting anaesthetist to the Royal Infirmary and other Manchester hospitals.

We regret to announce the death on December 23, 1937, at Hungerford, Berks, of Dr. THOMAS GORDON STARKEY-SMITH. He was born in 1880 the youngest son of T. Starkey-Smith, F.R.C.S., of Warrington, Lancs, and studied medicine at St. Thomas's Hospital, taking the English Conjoint diplomas in 1907, the M.B., B.S.Lond. in 1908, and the M.D. in 1910. After holding the post of senior obstetric house-physician at St. Thomas's Dr. Starkey-Smith began general practice, and during the war was medical officer in charge of the Savernake Red Cross Hospital. His appointments included those of anaesthetist to the Savernake Hospital, medical officer and public vaccinator for Hungerford, and medical officer to the infirmary and the infant welfare centre. He was well known locally as a Freemason and cricketer, and through his enthusiasm for ancient customs gave strong support to the picturesque Hocktide celebrations at Hungerford. He joined the British Medical Association in 1912 as a member of the Reading Division.

Mr. DONALD DOUGLAS DAY, who died at Harleston, Norfolk, on December 20, 1937, aged 79, was formerly well known as a surgeon in Norwich and the surrounding country. At St. Bartholomew's Hospital he won a senior scholarship and the Lawrence scholarship in 1880, in which year he qualified M.R.C.S., L.S.A., and graduated M.B., B.S.Lond., with a gold medal in surgery. After holding a prosectorship at the Royal College of Surgeons of England he became house-surgeon to the Norfolk and Norwich Hospital, and making his home in that city was later elected assistant surgeon, and finally full surgeon, to the hospital. He obtained the F.R.C.S. in 1883. Mr. Day was a member of the British Medical Association for half a century, and in his years of active surgical practice contributed notes on lithotomy and on abdominal operations to these columns.

Dr. DAVID MORGAN, for sixteen years medical superintendent of the Cunard Steamship Line, died on December 26, 1937, after a long illness, aged 75. He studied medicine at University College, London, and Edinburgh, graduating M.B., C.M.Ed. in 1884. For some years he helped Hugh Owen Thomas and Sir Robert Jones in their orthopaedic work, and from 1897 to 1910 he was examining officer for the Cunard Company at Liverpool for passengers and emigrants to America. Dr. Morgan was one of the earliest to take up medical radiology, and for some time acted as radiologist to the Royal Southern Hospital, Liverpool. He joined the British Medical Association in 1889, and at the Annual Meeting at Liverpool in 1912 was vice-president of the Section of Electrotherapeutics. Since his retirement from the service of the Cunard Company in 1926 he had lived at Hampstead Way, London, N.W. During the war he superintended the fitting out of the *Mauretania* as a hospital ship and sailed in her to the Dardanelles.

One of Glasgow's oldest medical practitioners, Dr. ROBERT WILSON STUART, died recently after a very brief illness. The son of an Aberdeen merchant, Dr. Stuart went to Glasgow in the early 'seventies, and, after studying at Anderson's College and the Royal Infirmary, took the L.R.C.P. and S.Ed. in 1879. Going to Shetland as an assistant, he succeeded to the practice of his principal at Dunrossness, and shortly afterwards was appointed medical officer of health for the districts of Dunrossness, Sandwick, and Cunningsburgh. A few years later he returned to Glasgow, where for close on half a century he has carried on a large and successful practice in the north-west area of the city. Soon after his return he became associated with the late Dr. Angus Macphee in the work of the Glasgow Training Institute for Nurses, in Scotia Street. The institute had been started by Dr. Macphee some years earlier for the purpose of improving the status of handywomen and raising them from the "Sairey Gamp" plane to one approaching nearer that of the trained nurse. When the State Registration of Midwives Act came into force during the war handywomen who were in active practice at the time were admitted to the new register on passing a very nominal examination. It was Dr. Stuart's boast that practically all the Glasgow "howdies" so admitted had been trained by Dr. Macphee and himself. Dr. Stuart, who had been a member of the British Medical Association for fifty-

three years, was keenly interested in the new Maternity Services (Scotland) Act and in the fight which is now going on among the profession in Scotland for more adequate remuneration for those taking service under that Act and for the insistence on free choice of doctor and continuity of service to the patient. With a long and wide experience of maternity work behind him he had little patience with much that has been voiced by propagandists. Two years ago Dr. Stuart gave up his panel work. Asked how he was filling in the unwonted leisure time thus left him, his invariable answer was, "I'm doing research work. I'm trying to discover when child-bearing became a pathological, instead of a normal physiological, process."

By the death of DANIEL FREDERICK RAMBAUT, M.D. (writes Dr. J. Lougheed Baskin) a very distinguished colleague has passed away, one who was among the earliest medical men to introduce occupational therapy into mental hospitals. He was the registrar of the Medico-Psychological Association many years before it obtained the Royal prefix, for which the late Dr. J. R. Lord was responsible, and three years ago he became its president. Those who knew him in his early life remember him as a brilliant athlete. At the Royal School, Armagh, he was held in great respect. He was the champion hurdler of Ireland, and once succeeded in beating the English champion. He made a mathematical study of this sporting event, and demonstrated that three strides between the hurdles are necessary. He and the late Alexander Macdonald were international rugger men, the latter being captain of the Irish fifteen. He was also a good cricketer and hockey player. Rather short, strongly built, and handsome, he was a good companion and staunch friend, and though his sympathies were with the mentally afflicted, in ordinary life he did not suffer fools gladly.

As one of his old colleagues (writes Dr. H. Horsman McNabb) I know the death of ALEX. HILL GRIFFITH, M.D.Aberd., F.R.C.S.Ed., consulting ophthalmic surgeon, Royal Infirmary, Manchester, consulting surgeon, Manchester Royal Eye Hospital, which occurred at his residence at Woking on November 24, will be deeply regretted by all his old students, friends, patients, and other colleagues. After graduating M.B., C.M. he came to the Manchester Royal Eye Hospital as house-surgeon in 1879, later becoming a member of the honorary staff, and it was here that his chief work was done. From the first he showed his energy and zeal. He was responsible for the introduction of cylindrical lenses in the correction of astigmatism, and his work in diseases of the choroid and vitreous became universally known. Griffith won the Middlemore Prize in 1897, and was the first president of the North of England Ophthalmological Society, in whose meetings and welfare he took the keenest interest. Jovial and kindly by nature, he put his whole heart into his work, and was greatly respected for his sincerity and ability.

Dr. ABRAHAM HEPWORTH ROBINSON of Bridlington died suddenly on December 26, 1937, aged 77. A student of the University of Edinburgh, he took the M.R.C.S.Eng. in 1888 and graduated M.B., C.M.Ed. in 1893. He had practised at Low Moor, Bradford, for about forty years. He took over from his uncle, Dr. Whitteron, and his son, Dr. H. W. Robinson, now carries on the practice, which has been in the family for more than one hundred years. While at Low Moor Dr. A. H. Robinson was an active political worker; he was appointed to the Bench in 1889 and was the senior Justice of the Peace for Bradford. Since his retirement, about fifteen years ago, he had lived mainly at Bridlington. He had been a member of the British Medical Association for over thirty years.

In the obituary notice of Dr. C. E. Jones-Phillipson, published last week, he was incorrectly stated to have been an old student of St. Bartholomew's Hospital. He was, in fact, a St. Thomas's man: a student there from 1891 to 1896.

Medico-Legal

COMPLAINT OF FAULTY DIAGNOSIS

At Manchester Assizes on December 10 Mr. Commissioner (now Mr. Justice) Henn Collins dismissed a claim made by a former policeman against a medical man, that the doctor had failed to examine him properly or skilfully and to diagnose tuberculosis.

The plaintiff said that in May, 1934, he had joined the Lancashire County Constabulary, passed a medical examination, and went through a strenuous course of training. In September he was transferred to the police barracks at Walkden as a probationer. On November 1 he developed a persistent cough, and in January, 1935, he saw the defendant, who did not examine his chest but gave him some medicine. At the end of February the doctor examined his throat and gave him an application. In March his cough became much worse, but the doctor when examining him did not ask him to strip, but applied a stethoscope outside two pullovers and a vest. In May and June he went for a cruise, and towards the end of June he complained to the doctor that his cough was as bad as ever. He felt very tired, his appetite had gone, and his weight had dropped. In July, when he complained he could not carry on his work, the doctor had said, "Nonsense!" In August he was told to take cod-liver oil, and towards the end of the month, when he was too ill to get up, the doctor still did not diagnose anything wrong with him but recommended that he should be sent to a seaside division. He consulted another doctor, who diagnosed tuberculosis, for which he was discharged from the police.

A sanatorium officer said that the plaintiff was suffering from advanced tuberculosis of both lungs with ulceration, and would not work again. His expectation of life was only a few years.

The defendant said in evidence that he had diagnosed catarrh in April, 1935, after examination with a laryngoscope. Later on, examining the chest with a stethoscope and by other methods, he had found nothing abnormal. The plaintiff never was robust, and had not been getting enough food. He was not particularly happy at the Walkden station. On August 1 he had seen the plaintiff at the station and examined him thoroughly. It had never occurred to him that tuberculosis was present, and it was easy to be wise after the event. On August 26 a senior police surgeon had examined him and found no evidence of any localized disease in his lungs. He was a case of long-standing tuberculosis which had shown no signs for a considerable time and had then flared up.

The learned Commissioner, giving judgment, said that a man faced with such an awful blow was apt to attribute his misfortune to some neglect or other. Once it was conceded that the signs of this type of tuberculosis might not be apparent at all times a medical man who failed to detect them could not be charged with negligence. He was satisfied that the defendant had found sufficient physical signs to account for the cough. He could not believe that the doctor had used a stethoscope outside the patient's underclothing, for if he was being slipshod he would not bother to do anything so entirely useless.

LEAD POISONING FROM WATER

An interesting point of law arose during an action tried at the recent Manchester Assizes.[1]

A married couple who had managed a public-house supplied with water by the Irwell Valley Water Board sued the Board for damages for personal injury due to lead poisoning, and alleged that the Board had not carried out their statutory duty. The evidence showed that the couple had suffered illness in 1934 and 1935, had been forbidden to drink any more water from their own taps, and had given up their licensed house in June, 1937. Mr. G. L. Lynskey, K.C., said that the highest figure taken by any authority as a standard was one part of lead in one million parts of water, and that above that proportion the water was dangerous. Between 1928 and the end of 1935 there had, he said, been a plumbo-

[1] *Manchester Guardian*, December 3 and 4, 1937.

absorbent in water from the Scout reservoir reaching taps of as much as twenty-eight parts per million. In 1929 a serious complaint of lead poisoning was made. By October, 1930, the Board had full knowledge that cases of lead poisoning had occurred, but did not apply for borrowing powers to erect a hardening plant till May, 1932. A Ministry of Health inquiry was held in May, 1933, but no hardening plant was installed until 1936. An analytical chemist who had tested the water said in evidence that it could not be passed through lead or tin-lined pipes (such as were fitted in the public-house) without absorbing some of the lead. If it stood for an hour it might absorb a dangerous quantity. The question for decision was, therefore, whether a water undertaker who supplies to the stop-cock outside premises water that is pure but capable of absorbing dangerous quantities of lead has a duty to warn the occupiers of that danger. The Commissioner found that the Board had satisfied their statutory duty but that they had also a common law duty to warn the consumer that he must take the necessary precautions to prevent the pure water which they supplied from becoming contaminated with lead. He was satisfied that they had not given the occupiers warning of any kind, and he therefore awarded the couple £873 damages and costs.

Universities and Colleges

UNIVERSITY OF LONDON

The following candidates have been approved at the examination indicated:

M.S.—Branch I (Surgery): G. S. Ferraby, K. L. James, C. J. B. Murray. *Branch IV (Laryngology, Otology, and Rhinology):* M. P. Ellis.

UNIVERSITY OF BIRMINGHAM

The following medical degrees were conferred at a congregation held on December 17:

M.D.—H. B. Hunt.
M.B., CH.B.—J. H. Briscoe-Smith, R. T. R. Freshwater, K. A. Marandi, P. E. Morris, Frances C. Myatt.

UNIVERSITY OF BRISTOL

The following candidates have been approved at the examinations indicated:

FINAL M.B., CH.B.—*Section II:* R. L. J. Derham, H. D. T. Gawn, M. E. M. Herford, F. J. W. Hooper, G. L. Page (with distinction in public health), Anna H. Silberstein. *In Group II (completing examination):* P. N. Heron, P. K. Jenkins.

NATIONAL UNIVERSITY OF IRELAND

UNIVERSITY COLLEGE, CORK

The following candidates have been approved at the examinations indicated:

M.D.—T. O'Neill.
M.B., B.CH., B.A.O.—J. C. Dundon (first-class honours), J. A. Allen, P. Buckley, P. Coffey, K. A. Flaherty, F. S. Kelleher, D. J. G. Maher-Loughnan, C. Marchment, E. F. Mulcahy, Ellen M. M. Murphy, P. Murphy J. S. O'Mahony, P. J. Ryan. *Part I:* Mary Corbett, J. Hutch, L. Kelly, D. J. R. McConvell, D. O'Keeffe, P. O'Keeffe, Mary F. O'Leary. *Part II:* C. J. Clohessy, G. R. Cubitt, J. Fitzgerald, J. G. Paton, M. F. Ronayne.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

The course of lectures for 1938 is arranged as follows: January 17, Professor J. Cole Marshall, The surgical treatment of detachment of the retina; January 19, Professor Reginald T. Payne, Cancer of the stomach as a surgical problem; January 21, Professor R. C. Brock, Pathology, diagnosis, and treatment of intrapulmonary new growths; January 24, Professor William E. Underwood, Recent observations on the pathology of hydronephrosis; January 26, Professor J. I. Munro Black, The lympho-epitheliomata; January 28, Professor Maxwell Ellis, The function of the bronchial tubes; January 31, Professor T. W. Mimpriss, Treatment of retention of the testis; February 2, Professor Harold Rodgers, Endoscopic appearances of normal gastric mucosa and its variations in disease; February 4, Professor T. F. Todd, Rectal ulceration following irradiation treatment of carcinoma of the cervix (pseudo-carcinoma of the rectum); February 7, Professor H. J. B. Atkins, Chronic mastitis; February 9, Professor T. Stewart Heslop, An experimental study of the neurogenic origin of peptic ulceration; February 11, Professor P. B. Ascroft, An experimental study of the surgical treatment of arterial hypertension; February 14, Sir Arthur Keith, F.R.S., The prehistoric people of Mount Carmel; February 16, Dr. W. E. Gye, Some recent work in experimental cancer research. All the lectures begin at 5 p.m.

SOCIETY OF APOTHECARIES OF LONDON

The following candidates have passed in the subjects indicated:

SURGERY.—F. B. Akeroyd, J. S. Lancaster, J. D. B. Perkins.
MEDICINE.—F. Bastawros, F. C. E. Diamond, D. C. Light.
FORENSIC MEDICINE.—F. Bastawros, F. C. E. Diamond, D. C. Light.
MIDWIFERY.—J. M. Hardy, P. H. Hay-Heddle, R. Lipkin.

The diploma of the Society has been granted to F. Bastawros, F. C. E. Diamond, and D. C. Light.

The Services

DIRECTOR OF R.A.F. MEDICAL SERVICES

Air Commodore A. V. J. Richardson, C.B., O.B.E., has been appointed Director of R.A.F. Medical Services, Air Ministry, as from March 1, in succession to Air Vice-Marshal Sir Alfred W. Iredell, K.B.E., C.B., who retires from the Service on that date.

HONOURS

Lieut.-Colonel R. K. Mallam, R.A.M.C., has been appointed an Officer of the Military Division, and Captain G. E. S. Stewart, I.M.S., a Member of the Military Division, of the Most Excellent Order of the British Empire, for valuable services rendered in the field in connexion with the operations in Waziristan during the period January 17 to September 15, 1937.

DEATHS IN THE SERVICES

Lieut.-Colonel CHARLES JOSEPH MACCARTIE, Bengal Medical Service (ret.), was born on March 30, 1851, the son of Daniel MacCartie of Skibbereen, and graduated B.A. and M.D. in 1873 and M.S. in 1874 at the Queen's University of Ireland. He entered the Indian Medical Service as surgeon on September 30, 1874, became surgeon lieutenant-colonel after twenty years' service, and retired on June 25, 1900. All his service was spent in military employment, and he had a fine record of war service: Afghanistan 1878–80 in the actions at Saifudin and Shahjui, severely wounded near Kandahar, mentioned in dispatches in the *London Gazette* of October 24, 1879, medal; Burma 1891–2, medal with clasp; Chitral 1895, the relief of Chitral, medal with clasp; North-West Frontier campaign of 1898, at Tirah, clasp; Mohmand, Malakand, and Bajaur operations, clasp. He was granted a good service pension on September 10, 1927. He was the author of *A New System of Field Hospitals and Ambulances for Hill Warfare*, 1898. He had been a member of the British Medical Association for thirty years.

Lieut.-Col. ROBERT MCLAUCHLAN DALZIEL, I.M.S. (ret.), died at Muckhart, by Dollar, on December 17, 1937, aged 61. He was born on July 13, 1876, and was educated at Dollar Academy and at Edinburgh University, where he graduated M.B., C.M., in 1899. He entered the Indian Medical Service as lieutenant on January 29, 1901, became lieutenant-colonel on July 29, 1920, and retired on January 29, 1926.

Surgeon Major GEORGE SULLIVAN CLIFFORD HAYES, O.B.E., late 1st Life Guards, died at Le Manoir Forest, Guernsey, after an operation, on December 20, 1937. He was educated at Guy's Hospital, and took the M.R.C.S.Eng., L.R.C.P.Lond. in 1902. After filling the posts of clinical assistant at Charing Cross Hospital and resident medical officer at the Hospital for Women in Soho Square he entered the Army, and soon afterwards was posted to the Household Brigade, from which he retired as surgeon major of the 1st Life Guards, and joined the Reserve of Officers. He raised Lord Derby's Field Ambulance in 1915, and commanded it in France in 1915–16. After the war he went to South Africa, where he compiled a report on *The Physical Conditions and Mental Defects of School Children in Southern Rhodesia*, a report to the British South Africa Company in 1920.

EPIDEMIOLOGY AND VITAL STATISTICS

No. 51

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended December 25, 1937.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Irish Free State. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 125 great towns (i) in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns (ii) in the Irish Free State. (e) The 10 principal towns (iii) in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1937					1936 (Corresponding Week)					1928-36 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	27	7	9		3	18	1	8		—		
Deaths		1	2				—	1				
Diphtheria	1,291	149	198		45	1,334	169	251		43	1,336	215
Deaths	37	1	7	4	1	36	2	4	2	2		
Dysentery	270	72	58		—	29	4	47		—		
Deaths				—	—				—	—		
Encephalitis lethargica, acute	6	—	—		—	5	—	—		—		
Deaths		—					—					
Enteric (typhoid and paratyphoid) fever	19	1	7		6	21	2	7		—	22	—
Deaths	4	1	—	—	1	—	—	—	—	—		
Erysipelas			81		4			81		5		
Deaths		1					1					
Infective enteritis or diarrhoea under 2 years												
Deaths	49	12	3	2	3	44	9	9	6	1		
Measles			506		295*			50		4		
Deaths	31	1	5	2	6	3	—	—	2			
Ophthalmia neonatorum	67	4	23		—	71	4	30		—		
Deaths												
Pneumonia, influenzal§	1,093	149	403		10	982	113	17		10	1,152	142
Deaths (from Influenza)	46	4	15	1	2	57	12	4	1	—		
Pneumonia, primary					25			322		14		
Deaths		24		18	26		25		29	14		
Polio-encephalitis, acute	—	—			—	1	—			—		
Deaths							—					
Poliomyelitis, acute	5	—	—		—	7	2	2		—		
Deaths		1					—					
Puerperal fever	†	1	11		1	31	2	25		1		
Deaths		1					1‡					
Puerperal pyrexia	122	5	16		—	106	13	22		3		
Deaths												
Relapsing fever	—	—	—		—	—	—	—		—		
Deaths												
Scarlet fever	2,244	131	493		86	2,053	196	394		35	2,451	298
Deaths	7	1	1	2	1	5	1	1	2	2		
Small-pox	—	—	—		—	—	—	—		—		
Deaths	—	—		—	—	—	—		—	—		
Typhus fever	—	—	—		—	—	—	—		—		
Deaths	—	—			—	—	—		—	—		
Whooping-cough			46		5			357		9		
Deaths	18	6	3	—	2	16	4	9	6	—		
Deaths (0-1 year)	431	77	97	16	31	369	65	103	38	27		
Infant mortality rate (per 1,000 live births)	72	64				59	54					
Deaths (excluding stillbirths)	5,711	1,105	916	182	195	5,339	1,058	811	232	164		
Annual death rate (per 1,000 persons living)	14.1	13.9	17.2	12.4	17.3	13.3	13.2	15.6	16.1	15.7		
Live births	5,011	1,004	803	197	195	6,014	1,148	901	312	20		
Annual rate per 1,000 persons living	12.4	12.6	16.4	13.9	17.3	15.0	14.3	18.5	21.6	19.3		
Stillbirths	268	37				254	3					
Rate per 1,000 total births (including stillborn)	51	36				41	2					

(i) 122 great towns in 1936
(ii) 12 „ „ „
(iii) 9 „ „ „
* 292 cases in Belfast alone

† All cases notified as puerperal pyrexia after October 1, 1937

‖ Type of pneumonia not specified in figures for Irish Free State and Northern Ireland

‡ Death from puerperal sepsis

§ Includes primary form in figures for England and Wales and London (administrative county), Northern Ireland, and Scotland

N.B.—The figures for notifications in the Irish Free State were not available in time for publication this week.

EPIDEMIOLOGICAL NOTES

Typhoid Fever.—At the time of going to press 290 cases have been notified in the Croydon outbreak with thirty-seven deaths. During the week ended January 1, 1938, there were three cases and five deaths.

Diphtheria and Scarlet Fever.—During the week under review notifications of diphtheria were lower both in London and in England and Wales than the "expected" numbers based on the median values for the last nine years, and much lower than those for the corresponding week last year. The same holds true for scarlet fever, with the exception that the figures for England and Wales were somewhat in excess of those for the corresponding week last year—2,244 compared with 2,053. The reduction in incidence of these diseases is particularly opportune in London, where an epidemic of measles is beginning to make itself felt, as it has for several weeks past in Manchester.

Dysentery and Infective Enteritis.—The incidence of dysentery in England and Wales appears to be falling, with 270 cases notified against 411 in the previous week. In Wales there was only one case, against eleven (ten in Swansea) in the previous week. The widespread character of the disease is evident from the mere list of areas chiefly affected (the figures in brackets are notifications in the previous week): Chester, 1 (14); Devon, 28 (42), of which 16 were in Okehampton and 4 in Barnstaple; Essex, 19 (33); Kent, 25 (8), of which 13 were in Tonbridge; Norwich, 29 (21); Nottingham, 7 (21); Stafford, 20 (18), of which 12 were in Cannock; and Surrey, 11 (10), of which 4 were in Carshalton and 2 each in Sutton and Malden. The metropolitan boroughs chiefly affected were: St. Pancras, 12 (14); Lewisham, 8 (21); Islington, 6 (3); and Bermondsey, 4 (7); a few boroughs escaped completely. Of the 17 cases notified in the county of Middlesex 6 were in Hornsey, 4 in Enfield, and 2 in Willesden. The great majority of these cases appear to be of the mild Sonne variety; it is not possible to give the fatality rates as the weekly returns do not include deaths from dysentery. On the other hand, the figures for deaths from enteritis and diarrhoea under 2 years are available but not the numbers of notified cases. The deaths, however, provide a reliable comparative index of the prevalence and severity of these infections. During the week the deaths were 49 and 12 in England and Wales and London respectively, compared with 57 and 15 in the previous week and 44 and 9 in the corresponding week last year.

Medical News

The Hunterian Lecture will be delivered before the Hunterian Society at the Mansion House, E.C., on Monday, January 17, at 9 p.m., by Dr. Gustav Singer of Vienna, on "Functional Disorders of the Intestine."

An exhibition of Chinese art to raise money for Chinese medical relief is being held at 9, Conduit Street, W., and will remain open until January 28.

The German Society of Balneology and Climatology will hold its annual meeting at Kiel from February 24 to 27, when the subjects for discussion among others will be thalassotherapy, including the physics and meteorology of coastal climate, treatment of tuberculosis on the flat land and on the coast, and treatment of children at sea.

In connexion with the jubilee meetings of the Indian Science Congress Association, which opened at Calcutta on January 3 under the presidency of Sir James Jeans, honorary degrees are to be conferred by the University of Calcutta on eight visiting men of science, including Dr. Charles S. Myers, Principal of the National Institute of Industrial Psychology, and Dr. Straub, Professor of Pharmacology at Munich.

The League of Nations has sent a medical mission to the Far East to take measures to prevent or control the spread of epidemics. The mission is headed by Inspector-General Lasnet of the Académie de Médecine, Dr. Hermann Mooser, representing Germany, and Dr. Robert Cecil Robertson, representing Great Britain. The mission will first visit Hong Kong and continue its work in South China.

The first number of a new journal entitled *Konstitution und Klinik* will be published this month under the general editorship of Professor Dr. W. Jaensch and Professor Dr. F. Rott of Berlin, by J. A. Barth, Leipzig. The price is RM. 7.60.

The December issue of the *Journal of Nervous and Mental Diseases* contains a sympathetic appreciation of Dr. Kinnier Wilson by Dr. Foster Kennedy, which was delivered before the American Neurological Association last June.

The issue of *La Presse Médicale* for December 18, 1937, is devoted to articles by Italian physicians and surgeons, including an article by Professor Catterina on the occasion of the fiftieth anniversary of Bassini's operation for hernia.

The Mental After Care Association (founded in 1879) earnestly appeals for funds to carry on and extend its work for early and after-care patients and those suffering from nervous diseases. Nearly 4,000 were assisted last year. The president is Viscount Wakefield, and the secretary Miss E. D. Vickers, 354, Grand Buildings, W.C.2.

Sir Joseph Skevington, consulting surgeon to King Edward VII Hospital, Windsor, since 1903, retired on January 1, but he will remain as honorary radiologist. He was presented with an illuminated album bearing the signatures of the Duke of Gloucester, president of the hospital, and members of the committee.

At the Philadelphia General Hospital a "blood bank" has been established—the second in the United States—where quantities of blood, stored in refrigerated vaults, are immediately available for emergency transfusions.

Mr. Leslie Paton has been elected an honorary member of the Royal Society of Medicine of Budapest on the occasion of the centenary of its foundation.

The University of Paris has recently conferred an honorary doctorate on Professor E. W. Archibald of McGill University, Montreal, who was elected an Honorary Fellow of the Royal College of Surgeons of England in 1927.

Dr. Grégoire, professor of surgery in the Paris Faculty of Medicine, has been elected a member of the Académie de Médecine in succession to the late Professor de Lapersonne.

Dr. Marinesco, professor of neurology at Bucarest, has recently been elected Grand Officer of the Legion of Honour. He is the first Rumanian doctor to receive this high distinction.

A Reuter telegram states that the epidemic of infantile paralysis in Victoria has now reached a figure of 1,400 cases notified, and there have been seventy-eight deaths. The disease is spreading into South Australia and Tasmania.

A medical centre has recently been created in the Belgian Congo by the free University of Brussels.

Miss Emily Benziehausen has given the Pittsburg Children's Hospital one million dollars for the investigation of diabetes in children.

An institute for investigation of the cause of influenza has been founded at Budapest.

The Budapest correspondent of the *Daily Telegraph* states that by a decree of the Minister of the Interior inoculation against diphtheria has become compulsory in Hungary. No conscientious objections will be allowed. Every Hungarian child must be inoculated—free of charge—at the age of 2 and again at the age of 6.

A monument has been erected in Rio de Janeiro to the memory of Professor Miguel Conto, who was president of the National Academy of Medicine for twenty years.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS if reprints are required, as proofs are not sent abroad.

All communications with reference to ADVERTISEMENTS should be addressed to the Advertisement Manager. Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House, Tavistock Square, W.C.1.

The TELEPHONE NUMBER of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The TELEGRAPHIC ADDRESSES are
EDITOR OF THE *BRITISH MEDICAL JOURNAL*, *Aitiology Westcent, London.*
SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh;* telephone: 24361 Edinburgh), and of the Office of the Irish Free State Medical Union (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin;* telephone 62550 Dublin).

QUERIES AND ANSWERS

Painful Tongue

DR. S. DE GRÓSZ (Budapest) writes in reply to "Worried" (*Journal*, December 18, 1937, p. 1259): The case seems to be one of Möller's superficial glossitis, as pernicious anaemia may be excluded. Though there was no response to ovarian extract, the possibility of a climacteric origin should not be overlooked; some gastric disturbance may also be of aetiological significance. As a mouth-wash I should recommend huckleberry tea, made from 250 grammes of huckleberries in 1.5 litres of water, inspissated to half this volume and squeezed out; its frequent use is of greater value than the application of silver compounds. Concerning general treatment, I recommend the intravenous administration of vitamin C, suggested by Volhard. I would like to hear from "Worried" if this treatment has any effect.

Income Tax

Supplementary Reserve Commission Gratuity

"EPSILON" inquires whether an annual gratuity of about £25 falls within the non-taxable class of gratuities referred to in a note which appeared in the *Supplement* of November 7, 1936.

*** No. "Epsilon's" gratuity is an annual payment made in connexion with an express or implied contract for service and as such is liable to income tax. The gratuities which we explained were not taxable are lump sum payments made on cessation of an appointment, and though arising out of the service rendered cannot be regarded as "annual," and are therefore not assessable to tax.

LETTERS, NOTES, ETC.

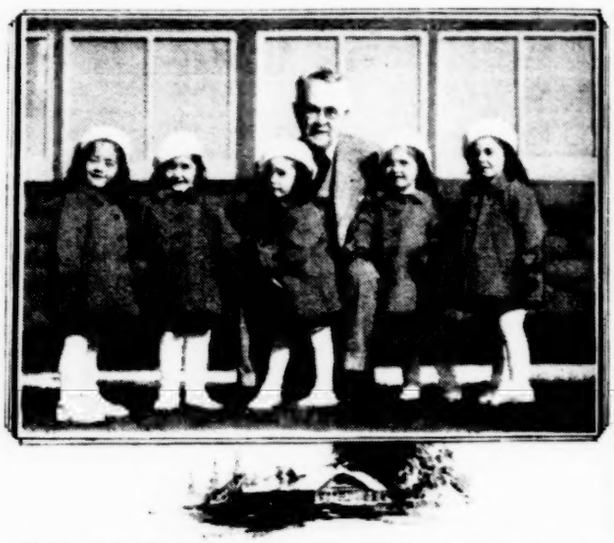
Chlorine Mixture for Typhoid

DR. ALEXANDER FRANCIS (London, W.1) writes: I would strongly advocate the giving of Burney Yeo's chlorine and quinine mixture to all typhoid fever suspects. There is much doubt as to the advisability of administering T.A.B. vaccine in such cases, but the chlorine mixture is absolutely harmless and safe. I had very considerable experience of the treatment of typhoid fever when in charge of a hospital in the west of Queensland, where typhoid was very prevalent. Many of the cases were desperate, because the bushmen made light of illness and would not come to hospital until the second or third week of the disease, after all home remedies, including "trying to ride it off," had failed. From the time I made use of Burney Yeo's chlorine mixture I was fortunate enough not to have a fatal case, and some of the recoveries in patients who were brought to hospital in the "typhoid state," delirious, with tongues like boiled leather and with sordes on the lips, were amazing. It is a common practice to chlorinate water in order to destroy the typhoid bacillus, and if chlorine mixture were given to suspects it would almost certainly prevent the disease from developing, and at all events make an attack much less severe. It is important that the mixture be made according to Burney Yeo's directions.

*** The instructions quoted in Martindale's *Extra Pharmacopoeia* are as follows: *Mistura Chlori cum Quinina (Burney Yeo).* To potassium chlorate, in powder, 30 gr., in a 12-oz. bottle, add hydrochloric acid 60 m.; cork and shake well to liberate chlorine; absorb this by gradually adding, and shaking after each addition, distilled water *q.s.* to 11 oz.; and quinine sulphate 24 gr. (or 36 if ordered), syrup of orange 1 oz. *Dose.*—1 oz. (30 ml.) every two, three, or four hours for typhoid; it quickly cleanses the tongue.

The Quintuplets and their Doctor

On May 28, 1934, Mrs. Elzire Dionne, a young French-Canadian living in a settlement two hundred miles north of Lake Ontario, gave birth to five living girls. Dr. Allan Roy Dafoe of Callander arrived after the birth of two of the infants, but was present during the delivery of the remaining three and took charge of the whole situation. The progress of the Dionne quintuplets has been a subject of world-wide publicity almost from the date of their birth. In the *Canadian Medical Association Journal* for November, 1937, Drs. A. R. and W. A. Dafoe reported that at 3 years the



children had reached an average weight of 30 lb. 8 oz.—at birth it was 2 lb. 11 oz. In general their health and physical development has been satisfactory. Two years ago we reproduced in this column a Christmas and New Year card showing the "quins" and their doctor at play on the nursery floor. Dr. A. R. Dafoe now sends us, with the compliments of the season, a contemporary group taken beside the self-contained wooden house where the children live under State care and protection; beneath the photograph is a little view of their home.

Cambridge Medical Women

The writer of a letter published in the *Sunday Times* of January 2 said with reference to Cambridge medical degrees: "Though women are admitted with men to this examination and take the same papers and viva voce, and appear, if successful, in the same lists as men, yet they are not recognized by Cambridge University as having taken the degree, and they are not entitled to add M.B.(Cantab.) after their names. They are not entitled, for instance, to make use of those words on a brass plate." This is incorrect. A woman who has received the title of the degree of M.B. from the University of Cambridge may add "M.B." or "M.B.(Cantab.)" to her name on her professional doorplate or elsewhere; and in fact "M.B." is added to her name in official lists published by the University.

Local Application of Prontosil Red

DR. J. F. P. GALLAGHER writes: I have obtained successful results in the treatment of erysipelas and acute dermatitis by using as a local application prontosil red, 7½ grains being dissolved in 1 oz. of distilled water. The value of this preparation as an external application should not be overlooked.